Renewable Energy and Sustainable Construction

Supplementary Planning Document
Adopted September 2013

www.waveney.gov.uk/LDF

EASTSUFFOLK COUNCIL

On 1st April 2019, East Suffolk Council was created by parliamentary order, covering the former districts of Suffolk Coastal District Council and Waveney District Council. The Local Government (Boundary Changes) Regulations 2018 (part 7) state that any plans, schemes, statements or strategies prepared by the predecessor council should be treated as if it had been prepared and, if so required, published by the successor council. Therefore this document applies to the part of the East Suffolk Council area formerly covered by the Waveney local planning authority area until such time that it is replaced.

waveney
LOCAL DEVELOPMENT FRAMEWORK

What is the purpose of this document?

This document sets out how the Council will approach planning applications related to renewable energy and sustainable construction.

Information is also provided about how new development can reduce its impact on the environment and how the operating efficiency of existing buildings can be improved.

Lowestoft Sixth Form College - BREEAM certified

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1. Introduction

1.1 What is the purpose of the Renewable Energy and Sustainable Construction SPD?

1.1.1 A Supplementary Planning Document (SPD) provides guidance to assist with the implementation of planning policies. It is a material consideration when making a decision on a planning application. This document contains information about; how to make existing and new buildings more energy and water efficient, renewable and low carbon energy generation, mechanisms to reduce the potential for flooding, waste recycling, transport and ways which development can conserve and enhance wildlife and biodiversity.

1.1.2 The guidance covers the whole of the administrative area of Waveney District, except that part lying within the Broads Executive Area. This area is covered by planning policies set out in the adopted Broads Authority Core Strategy and Development Management Policies documents.

1.2 How to use this document

1.2.1 The document is organised into sections that address issues related to particular planning policies. These issues are not mutually exclusive and some sections may need to be read in conjunction with others. At the end of each section a list of references, weblinks and websites that may be useful are provided. The text below provides a brief overview of the different sections within this SPD:

- **Section 1: Introduction**
  Provides background information including an overview of the planning policy context and the evidence base underpinning the Council's policies.

- **Section 2: Delivering Low Carbon and Renewable Energy**
  Discusses renewable energy generating technologies of commercial and domestic scales and issues that should be considered to fulfil the requirements of Policy DM03 'Renewable Energy'. Included within this section is:
  - factual information about low carbon and renewable energy technologies of both commercial and domestic scales;
  - potential benefits and constraints, including landscape and historic buildings and conservation areas;
  - an overview of how the Council will implement Policy DM03 and the type of information that should be included as part of any planning application.

Small-scale wind turbine, Ellingham Primary School

- **Section 3: Sustainable Construction**
  This section clarifies how new buildings can achieve higher environmental standards and comply with Policy DM04 'Sustainable Construction'. Much of the information in this section is equally applicable to both new and existing buildings. Section 3 discusses:
  - different building standards including the Code for Sustainable Homes and BREEAM;
  - elements that a prospective developer should consider as part of a proposal that will contribute towards CfSH or BREEAM compliance including energy, water, building materials, flooding and surface

water management, construction waste, pollution and noise, health and well-being, ecology, cycle storage and ways to reduce resource consumption during the lifetime of the building;

- an overview of how the Council will implement Policy DM04 is provided along with information that sets out what documentation should be submitted to the Local Planning Authority to support a planning application the way the Council will implement the policy has been varied from the text set out in Policy DM04. It is important that this section is read alongside section 6 which outlines planning application requirements.

- **Section 4: Carbon Emissions and Carbon Compliance**
  This section outlines the benefits of including energy efficiency measures in their proposals and encourages their consideration early in the design process. Guidance sets out how policy DM05 'Carbon Emissions and Carbon Compliance' will be applied.

- **Section 5: Lowestoft Lake Lothing & Outer Harbour Area Action Plan**
  Specifically relates to energy and water efficiency reduction requirements for development proposed in the Kirkley Waterfront and Sustainable Urban Neighbourhood, Peto Square and PowerPark in central Lowestoft. The implementation of Policies WEW1 'Energy Requirements', WEW2 'Water Efficiency and Quality' and WEW3 'Waste are discussed.


Lake Lothing, Lowestoft

- **Section 6: Planning Application Requirements**
  This section should be read in conjunction with all other parts of the document by those who intend to submit a planning application. It builds upon information provided earlier in the SPD and includes a summary of all the planning application requirements related to renewable energy and sustainable construction in the District.

- **Section 7: Monitoring**
  This section discusses how the Council will monitor policies related to Renewable Energy and Sustainable Construction. This will enable the Council to identify the effectiveness of the policies and if they need to be reviewed to assist with delivering the objectives set out in the Core Strategy.

1.3 Delivering Sustainable Development in Waveney

1.3.1 Delivering sustainable development is a key objective for Waveney District Council. This approach reflects national guidance set out in 'Securing The Future' and local aspirations identified in the 'Waveney Sustainable Community Strategy'. A priority for Waveney District Council is to contribute towards Suffolk's vision of creating the 'Greenest County'. The Waveney Sustainable Community Strategy states that:

"Waveney will be an attractive and accessible rural, coastal and urban environment that is an international centre of environmental excellence and in the delivery of low carbon and renewable energies; consistently bettering Government targets on climate change and carbon emissions."

1.3.2 Waveney's renewable energy, sustainable construction and carbon compliance policies require higher standards to be achieved than Buildings Regulations. This is in recognition that climate change may have a disproportionate affect on the local area. New development proposals should consider the wider elements of sustainability and the environment to be truly sustainable.

1.3.3 There are significant benefits to be gained by including passive design and energy efficiency measures as part of a development proposal. Consideration of these issues early in the design process can maximise site specific characteristics and improve the quality of new buildings. Reducing the impact a development will have on the environment will also benefit home owners and building occupiers by lowering the costs associated with operation of the building. Reducing energy demand will also lessen the need for additional energy infrastructure to improve energy security.

New housing development, Lowestoft

1.3.4 The plan period for housing requires approximately 6960 new dwellings to be built in the District between 2001-2025. As of 31st March 2013, 3811 dwellings have been completed with approximately 3150 to be delivered by 2025. Of these, approximately 1585 dwellings are expected to be built in central Lowestoft as set out in the Lowestoft Lake Lothing & Outer Harbour Area Action Plan (AAP). A significant amount of land is allocated for employment use in the Site Specific Allocations Development Plan Document (DPD) and the Lowestoft Lake Lothing & Outer Harbour AAP. There are also other existing employment sites dispersed throughout Waveney. New residential and non-residential buildings will provide a significant opportunity to deliver development that can reduce its environmental impact and contribute towards the 'Greenest County' objective.

1.4 National Planning Policy Context

1.4.1 The Government has stated that climate change is a significant issue facing the UK and has taken steps towards reducing greenhouse gas emissions through legislation. The Government has set a legally binding target of reducing greenhouse gas emissions by 34% by 2030 and 80% by 2050. To achieve this, Local Planning Authorities have the opportunity to set low carbon and renewable energy generation targets and construction standards to achieve this. Further background information on the planning legislation is provided in Appendix 1.

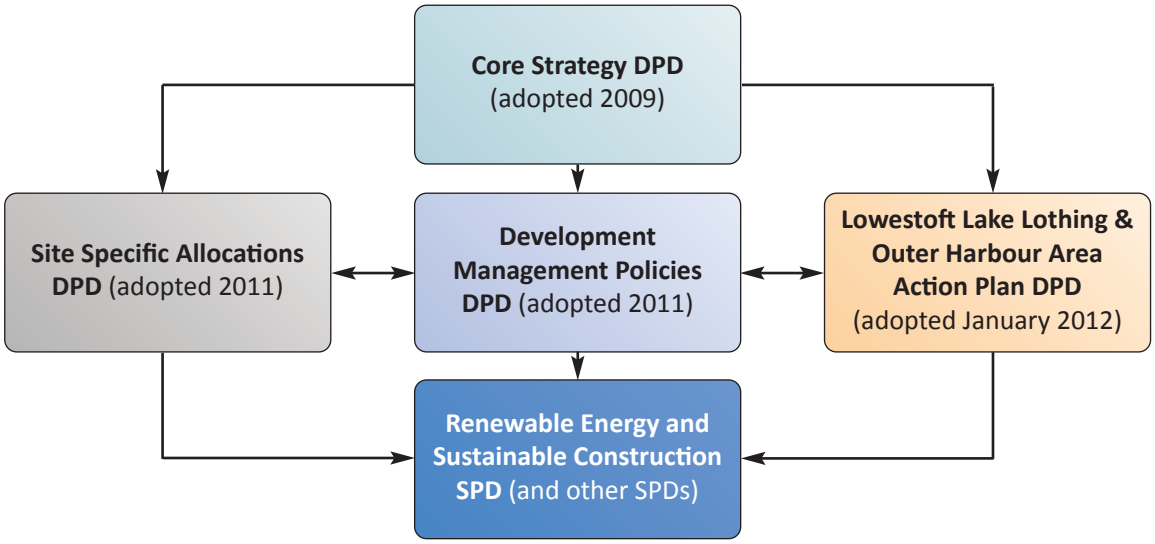
1.4.2 The 'National Planning Policy Framework' (NPPF) (DCLG, 2012) provides the planning framework to which local plans must comply. The NPPF encourages Local Planning Authorities to proactively address climate change by planning for development that will reduce carbon emissions, promote renewable energy generation and support community led initiatives. The potential impacts of climate change on flood risk, coastal change, water supply and changes to biodiversity and landscape should also be taken into account as part of the planning process.

1.4.3 'Planning practice guidance for renewable and low carbon energy' (DCLG, 2013) sets out guidance to assist with delivering the objectives in the NPPF. The document states how Local Planning Authorities should approach planning applications and the issues that need to be considered. Discussion is provided about the opportunities for community led initiatives and that proposals should be assessed on their own merits without the use of inflexible buffer zones.

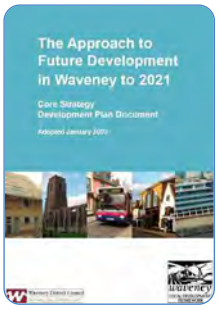
1.5 Local Planning Policy Context

1.5.1 The Local Development Framework consists of several documents that set out the Council's vision, policies to make planning decisions and guidance to assist with policy implementation. The Development Plan Documents (DPDs) contain the key policies against which planning decisions are made. The policy hierarchy is represented in Figure 1.

Figure 1 Waveney planning policy hierarchy



1.6 Core Strategy



1.6.1 The Core Strategy sets out the Council's strategy for future development in the District. This includes setting out the scale and distribution of development and the key factors that need to be considered when making planning decisions. More specifically, the Core Strategy identifies the Code for Sustainable Homes as a national standard that can assist with the delivery of new buildings that are more energy efficient, and overall, more sustainable.

1.6.2 Policy CS02 'High Quality and Sustainable Design' states that:

CS02 - High Quality and Sustainable Design (Part)

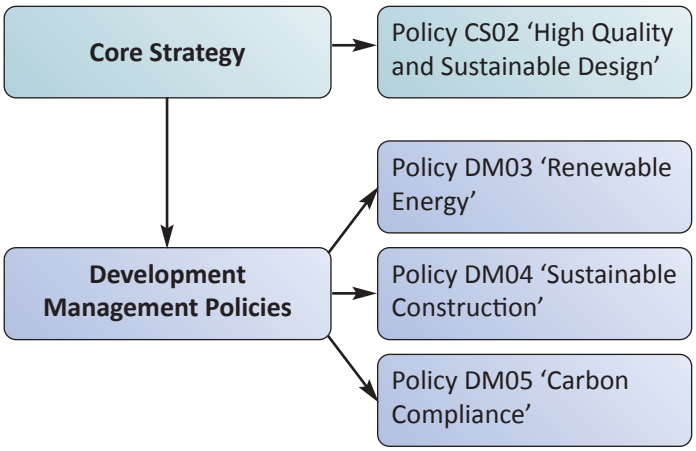
…"All development proposals will be expected to seek to minimise carbon dioxide emissions through sustainable design and construction, energy efficiency and the incorporation of renewable energy technology as appropriate. Proposals should also seek to minimise the use of water resources and the production of waste. Most proposals, including all proposals dealing with historic sites, should be accompanied by a Design and Access Statement."

1.6.3 This policy sets out the overriding principles of good design that need to be considered as part of a proposal. It identifies several principles that relate to other policies in the Core Strategy that may need to be taken into account when making planning decisions. It also provides the overarching context for the delivery of the supporting Development Management Policies DM03, DM04, DM05 below. In addition, to achieve high quality and sustainable design the Council will seek to apply complementary design standards including 'Building for Life' (Appendix 2).

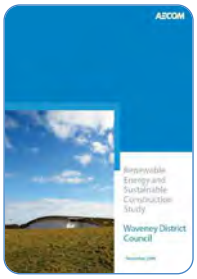
1.7 Development Management Policies

1.7.1 Development Management Policies are the detailed policies used to make planning decisions to deliver the vision and objectives set out in the Core Strategy and are applied across the District. There are several key planning policies to deliver renewable energy and well designed buildings that minimise their impact on the environment (Figure 2).

Figure 2 Waveney planning policies



1.8 Evidence Base



1.8.1 The Waveney Renewable Energy and Sustainable Construction Study (WDC, 2009) provides an assessment of the low carbon and renewable energy resources available in the District. It sets out how energy is currently generated and used in the District and where energy efficiency could be improved and mechanisms to do this. It also suggests potential strategies that could be implemented to meet the predicted growth in energy demand in both the commercial and residential sectors. An overview of energy use in Waveney is set out in Appendix 3.

1.8.2 The East of England Renewable and Low Carbon Energy Capacity Study (DECC, 2012) was part of a Government initiative to assess low carbon and renewable energy potential across the country using a standardised methodology. This provides more context about energy demand and generation in Waveney and neighbouring areas.

1.8.3 The Waveney and Great Yarmouth Joint Water Cycle Strategy Scoping Study (WDC, 2009) assessed local water supply and infrastructure in the District and highlighted the need to address a potential water deficit in the area from 2021. The Strategy also addresses drainage constraints and issues related to water quality and hydrology and how this may affect future development proposed in the District.

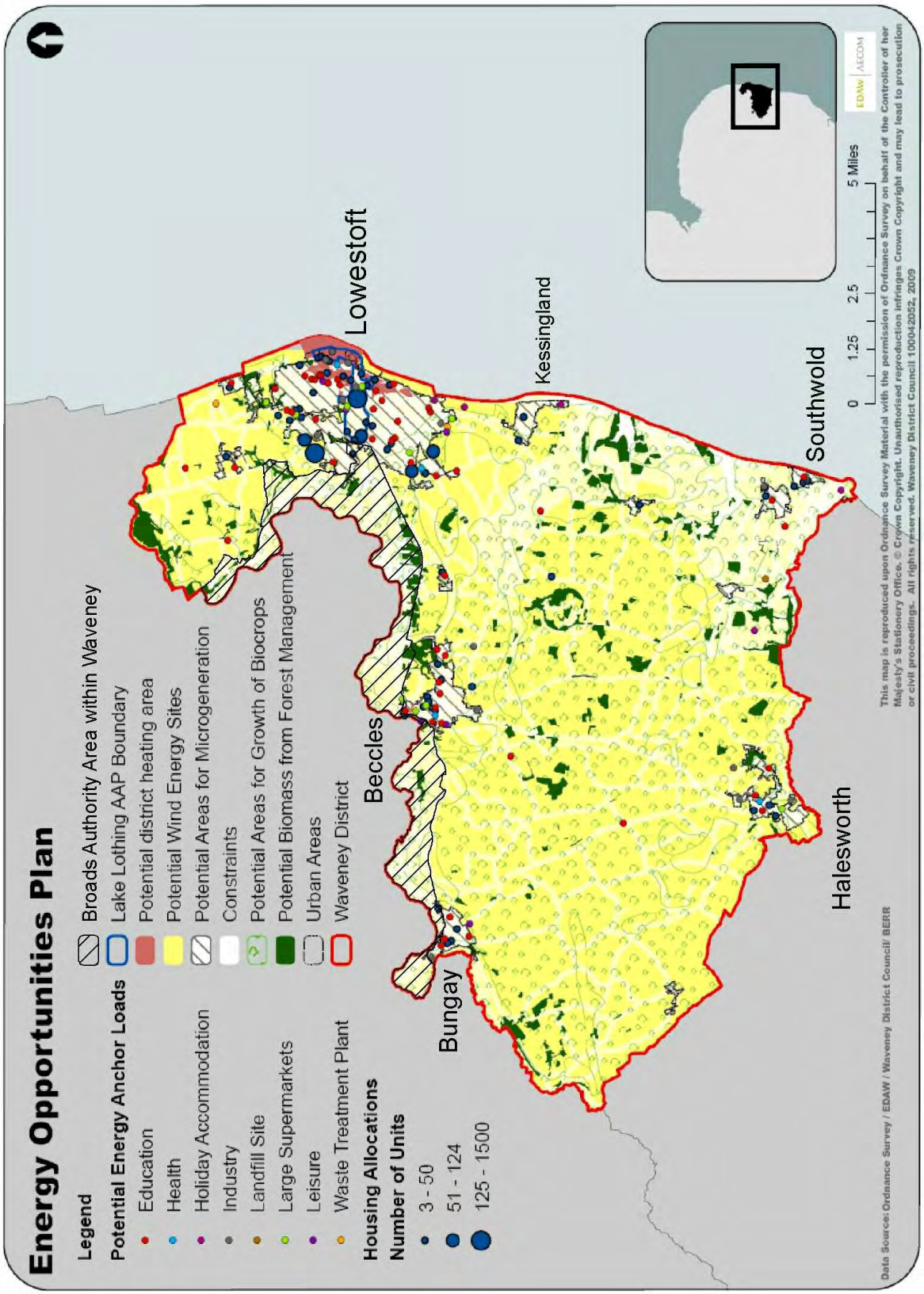
1.8.4 Other evidence bases may need to be considered as part of a planning application and these are referred to in the relevant sections in this document. Local sources of information may be relevant to a particular site or application and should be referred to on a case by case basis.

1.9 The Waveney Energy Opportunities Plan

1.9.1 The Waveney Energy Opportunities Plan (Figure 3) is a representation of where potential investment in low carbon and renewable energy technologies could be feasible. The Plan takes into account patterns of energy use, energy resources that are available and high level constraints such as protected landscapes, built up areas and transport routes. The Plan is underpinned by the Waveney Renewable Energy and Sustainable Construction Study.

1.9.2 The Plan is particularly relevant for larger renewable energy schemes rather than domestic-scale technologies. It is not intended to show if a planning application will, or will not, be considered acceptable. It does not take into account site specific characteristics that may support or restrict particular technologies. Individual proposals and planning applications will be treated on their own merits.

Figure 3 Waveney Energy Opportunities Plan



Source: Waveney Renewable Energy and Sustainable Construction Study (2009)

Delivering Low Carbon and Renewable Energy 2

2. Delivering Low Carbon and Renewable Energy

2.1 Policy DM03 – Low Carbon and Renewable Energy

Policy DM03 – Low Carbon and Renewable Energy

Proposals for stand alone energy generation and other CO2 reductions will generally be supported. The District is seeking new renewable energy generation capacity to deliver an appropriate contribution towards the UK Government's binding renewable energy target. Therefore targets for Waveney District include:

- approximately 30% electricity from renewable sources by 2021
- approximately 12% heat from renewable sources by 2021.

Renewable energy schemes will be permitted where:

- there are no significant adverse effects or cumulative adverse effects upon the landscape, townscape and historic features;
- there are no significant adverse effects on the amenities of nearby residents by way of noise, dust, odour or increases in traffic; and
- the wider environmental, economic, social and community benefits directly related to the scheme outweigh any potentially significant adverse effects.

In areas of national importance, large-scale renewable energy infrastructure will not be permitted unless it can be demonstrated that the objectives of the designation are not compromised. Small-scale developments will be permitted where they are sympathetically designed and located, include any necessary mitigation measures and meet the criteria above.

When the technology is no longer operational there is a requirement to decommission, remove the facility and complete a restoration of the site to its original condition.

How should Policy DM03 be applied?

2.1.1 Policy DM03 sets out a criteria based approach to consider the appropriateness of a planning application. These criteria are key factors in creating and fostering local identity and contributing towards a higher quality of life in our towns and rural areas. Proposals can enhance and adversely affect the District and this is considered as part of Policy DM03.

2.1.2 Waveney District Council is responsible for determining planning applications for renewable energy schemes that have an installed capacity of 50MW or less. For Policy DM03, small-scale and large-scale schemes are defined as follows:

- small-scale schemes - installed capacity of up to 50kW;
- large-scale schemes - installed capacity of 50kW or greater.

2.1.3 Large-scale technologies that could contribute towards Waveney's energy needs include anaerobic digestion plants, biomass fuels, combined heat and power, district heating, photovoltaic arrays and wind turbines. The Waveney Renewable Energy and Sustainable Construction Study sets out several scenarios where the District's renewable energy targets could be achieved. A brief overview of how to estimate the amount of energy a technology can supply is set out in Appendix 3.

2.1.4 Small-scale installations such as solar photovoltaic panels, solar thermal panels and heat pumps usually generate energy for one or two buildings and provide an important contribution towards long-term energy security. Depending on the scale and location of a proposal, small installations may not require planning permission. Such schemes are known as 'permitted development'.

How does the proposal contribute towards the District's renewable energy targets?

2.1.5 Policy DM03 is aimed at large-scale schemes that will contribute towards the District's low carbon and renewable energy targets at the strategic level. Low carbon and renewable energy proposals that have an installed capacity of 50kW or greater are expected to demonstrate how they contribute towards the renewable energy targets by setting out:

- the type of low carbon and renewable energy technologies to be installed;
- how much energy they will generate from renewable sources;
    - o installed capacity in kW or MW;
    - o the amount of energy generated annually (MWh per year);
- how the proposal will diversify energy generation in the District;
- if energy generated will be used on site, or exported to the national grid.

Wind farm, Somerton

2.1.6 The contribution a scheme will make to the District's energy targets is important but this should not override the need to protect the natural environment and places where people live from significant adverse impacts. These impacts will be identified on a case by case basis taking into account characteristics of the proposal, the site and the local area. Applicants are not required to demonstrate the need for renewable energy.

2.1.7 Areas that could feasibly accommodate low carbon and renewable energy generation proposals are shown on the Waveney Energy Opportunities Plan. However, the Plan does not take into account site specific constraints or cumulative impacts. Recognising this limitation significant weight should not be placed on the Plan when determining a planning application.

Is the proposal in the most appropriate location?

2.1.8 Where adverse impacts are likely to result from a development an applicant should demonstrate there are no other sites considered to be more appropriate. For such proposals the applicant should consider the following issues and how these compare with alternative sites:

- cumulative impacts in conjunction with existing development and those with planning permission;
- how the proposal may compromise the character of an area;
- impact the proposal could have on the landscape, townscape, environment and the amenity of

Anaerobic digestion plant and large scale wind turbine, Eye

residential areas;

- existing infrastructure that could supplement the proposal (eg. access, grid connections).

What if the proposal is larger than 50MW?

2.1.9 Proposals with an installed capacity greater than 50MW are Nationally Significant Infrastructure Projects. These planning applications are examined by the Planning Inspectorate who make a recommendation to the Secretary of State for the Department of Energy and Climate Change as to whether the proposal should be approved. The Secretary of State will decide if a proposal is granted planning permission.

2.1.10 When a planning application is submitted to the Planning Inspectorate the applicant must demonstrate they have completed a consultation on their proposals. Where a proposed scheme may affect the District Waveney District Council and Suffolk County Council will be consulted as statutory consultees.

2.1.11 Guidance set out in the National Policy Statements will provide the basis for making a planning decision. Local plans such as Waveney's Core Strategy and Development Management Policies are material considerations in the decision making process.

What if the planning application is for an extension of time of an existing consent?

2.1.12 Applications for an extension of time or renewal of an existing planning permission will be treated as a new application and therefore need to comply with the requirements set out in Policy DM03.

2.2 What Constraints Need to Be Considered?

2.2.1 Where low carbon and renewable energy technologies or ancillary infrastructure are proposed it is important that constraints are properly considered. Policy DM03 takes a positive approach to renewable energy installations but also recognises that these schemes can have a significant impact on the character of the local area. For proposals in or near protected areas the applicant is required to demonstrate that their proposal does not compromise the particular objectives of the designation to comply with Policy DM03. If there are concerns, the applicant is recommended to contact the body responsible for designating the site to clarify what value the site has. Protected areas located within Waveney's administrative boundary are identified on the Council's Proposals Map and Appendix 4.

AONB, Covehithe

2.2.2 Designated landscapes such as the Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB) in the south east of the District and the Norfolk and Suffolk Broads to the north are afforded protection in the NPPF which states "great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty" (para.115). Designated landscapes are also protected in Waveney's Local Development Framework by the following policies:

- CS17 'Natural Environment' (Core Strategy);
- DM27 'Protection of Landscape Character' (Development Management Policies);
- DM29 'Protection of Biodiversity and Geodiversity' (Development Management Policies).

2.2.3 Large-scale renewable energy development in these areas or in close proximity to environmental designations will generally not be supported unless it can be demonstrated there will be no significant adverse effects on the landscape or the wider environment. In these landscapes, greater emphasis on energy efficiency achieved through passive design is encouraged.

2.2.4 As part of a planning application, an applicant is expected to identify potential constraints and demonstrate the proposal will not have any significant adverse impacts on the landscape, townscape, historic features and amenity of nearby residents. The economic, social and community benefits should also be set out. The Waveney Landscape Character Assessment (WDC, 2008) is an important evidence base to assist with identifying potential impacts of a development on the local area. Further information about landscape and visual impact assessments is available from the Landscape Institute.

Sites of European Importance

Natura 2000 Sites

2.2.5 Natura 2000 sites are protected by European legislation and provide protection for areas of exceptional importance for rare, endangered or vulnerable natural habitats and species within the European Union. Natura 2000 sites are designated by the Secretary of State for Environment, Food and Rural Affairs (DEFRA) and managed by Natural England. The network consists of:

- Special Areas of Conservation (SACs) - sites of European importance for nature conservation designated under the Conservation of Natural Habitats and Wild Flora and Fauna Directive;
- Special Protection Areas (SPAs) - sites of European importance for nature conservation designated under the Conservation of Wild Birds Directive;
- Ramsar sites - wetlands of global importance, listed under the Convention on Wetlands of International Importance.

2.6.6 The following Natura 2000 sites are either wholly or partly within Waveney. Characteristics of these sites are set out in the Habitats Regulations Assessment Screening Report which accompanies this SPD.

- Benacre to Easton Bavents Lagoons SAC
- The Broads SAC
- Minsmere to Walberswick Heaths and Marshes SAC
- Benacre to Easton Bavents SPA
- Broadland SPA
- Minsmere to Walberswick SPA
- Broadland (Ramsar)
- Minsmere to Walberswick (Ramsar)

Benacre Broad

2.2.7 Proposals will need to consider if they will have an impact on European Protected Species (wildlife and plants). Where an applicant may disturb a protected site or the habitat of a protected species a license will need to be obtained from Natural England. Where a proposal may impact on a protected site or species the Council will need to be satisfied that:

- the proposal will preserve public health and safety or it is in the overriding public interest;
- there is no other satisfactory alternative; and
- the action will not be detrimental to the species concerned.

2.2.8 Renewable energy developments will not be supported where they may have an adverse impact on protected areas or species. Further information about European Protected Species and licensing is available on the Natural England website.

National designations

Area of Outstanding Natural Beauty (AONB)

2.2.9 Designated to conserve and enhance natural beauty which includes landform and geology, plants and animals, landscape features and the history of human settlement. AONBs are designated by Natural England. Guidance relating to the Suffolk Coast and Heaths AONB can be found in the AONB Management Plan (2013).

National Nature Reserve (NNR)

2.2.10 These areas are protected for their wildlife and geology. They are often also designated as Sites of Special Scientific Interest and provide access for the public to experience these sites. NNRs are designated by Natural England and two sites are in Waveney.

Norfolk and Suffolk Broads

2.2.11 Designated in its own right but is regarded as a member of the National Parks. The purpose of the Norfolk and Suffolk Broads designation is three fold:

- to conserve and enhance the area's natural beauty, wildlife and cultural heritage;
- to promote opportunities for the public understanding and enjoyment of these special qualities; and
- to protect the interests of navigation.

Oulton Broad

2.2.12 The character of the Broads or other designated sites such as an AONB extends beyond the designated boundary. It is therefore important to consider the visual impact any proposal may have on the setting of these landscapes. The Broads Authority completed the Landscape Sensitivity Study for Renewables and Infrastructure (2012) which provides further guidance about the appropriateness of wind turbines and solar PV in and around the Broads. Information about character areas adjacent to the Broads is discussed in the Waveney Landscape Character Assessment and planning considerations are set out in Policy DM27 'Protection of Landscape Character'.

Site of Special Scientific Interest (SSSI)

2.2.13 These areas are recognised as being nationally important for wildlife and geology where measures are taken to promote the safeguarding and enhancement of this interest through the regulation of management activities and development. Proposals for renewable energy developments will not be supported either in or adjacent to these designations. SSSIs are designated by Natural England. There are 11 SSSIs in Waveney.

Local designations

County Wildlife Site (CWS)

2.2.14 Non-statutory designations for sites of county significance for wildlife or geology. Development affecting them is controlled by local planning policies. CWSs are designated by the Suffolk CWS panel which consists of Natural England, Suffolk Biological Records Centre, Suffolk County Council and the Suffolk Wildlife Trust.

Local Nature Reserve (LNR)

2.2.15 Sites of local nature conservation importance are owned or managed by a local authority. LNRs are designated by local authorities in agreement with Natural England and have statutory protection. Many of these sites are also designated as SSSIs. There are three LNRs in Waveney.

Preserving local character, built heritage and archaeology

2.2.16 The District is home to a number of Scheduled Monuments, approximately 1600 listed buildings and other assets of local interest. Proposals that may have a detrimental impact on local character will not be supported unless this can be appropriately mitigated. Policies that specifically protect local character, built heritage and archaeology include:

- CS02 'High Quality and Sustainable Design' (Core Strategy);
- CS16 'Built and Historic Environment' (Core Strategy);
- DM02 'Design Principles' (Development Management Policies);
- DM30 'Protecting and Enhancing the Historic Environment' (Development Management Policies);
- DM31 ‘Archaeological Sites’ (Development Management Policies).

2.2.17 Developments proposed within or in close proximity of a Conservation Area or which entail alterations being made to a listed building, or the setting of, should contact the Council's Development Management Team. Issues related to listed buildings are further discussed on page 39.

2.2.18 Potential impact on the setting of heritage assets, local archaeology and the disruption of the inter-visibility between cultural heritage features will need to be considered. If the proposed development will result in the disturbance of archaeological remains preservation in situ is preferred, however, if this is not feasible preservation by record may be acceptable. A watching brief during construction may be suitable mitigation, although important archaeological remains will warrant recording prior to the commencement of works. The Suffolk County Council Archaeologist should be consulted to ascertain the potential for archaeological remains being present on site. Further information on local heritage is set out in the Council’s Built Heritage and Design SPD (WDC, 2012).

Are there any significant adverse impacts on the area?

2.2.19 Across Waveney there are different features and attributes that contribute towards local character. The Local Planning Authority will consult with Natural England and English Heritage once a planning application has been validated. However, it is recommended the applicant consult Natural England and English Heritage early in the planning application preparation process to identify any issues that may need to be mitigated to make the proposal acceptable.

2.2.20 Where a planning application is within or close to a designated landscape that crosses Waveney's administrative boundary, such as the Broads or the Suffolk Coast and Heaths AONB, the appropriate Local Planning Authority will be consulted by Waveney District Council. If there are concerns relating to adverse environmental impacts such as noise, dust and odour the Council's Environmental Protection Team can provide advice about ways to mitigate any potential issues.

2.2.21 Small-scale technologies, such as photovoltaic panels, solar thermal panels and heat pumps are less likely to compromise the objectives of a protected area. However, potential impacts on the environment will need to be considered and where necessary, mitigated. When a planning application is required, an applicant should state the proposed location of the technology, how it will be laid out where there is more than one component and any mitigation measures required to make it acceptable.

What are the benefits of the proposal?

2.2.22 Applicants are encouraged to set out the economic and social benefits for the local community and the District. This will improve the understanding of the proposal and the benefits (or impacts) it could bring to the local area. scheme will serve the local community or if the energy generated be transferred directly into the national grid for consumption.

Table 1 Potential benefits of renewable energy technologies

Economic	Environmental	Social
• Job creation • Develop industry expertise locally • Increasing energy security • Local investment to bring long-term financial gain • Cheaper fuel bills • Diversifying the local tourism offer • Opportunities for marketing • Income for landowners and the community • Farm diversification	• Reducing carbon emissions • Creating new environments for local wildlife • Managing existing environments • Reducing flood risk • Improving air quality • Reducing waste being taken to landfill	• Retention of the local workforce • Community involvement • Community pride • Education opportunities • Improving quality of life

When should renewable energy technologies be decommissioned?

2.35 For large-scale technologies such as wind turbines and photovoltaic arrays planning permission is commonly granted for a period of 25 years. A planning condition will be used to ensure that once a technology is no longer in operation it will be decommissioned, removed and the site restored to its original condition. If there are exceptional circumstances where the site cannot be restored to its original condition this should be clearly justified for the Council to consider. If a technology has ceased to operate for a continuous period of 12 months it will be considered to be no longer in operation unless additional information has been provided to, and agreed by, the Local Planning Authority.

2.3 What Types of Stand-Alone and Large-Scale Renewable Energy Technologies Can Contribute Towards Waveney's Energy Needs?

Anaerobic digestion

2.3.1 Anaerobic digestion (AD) is the process where plant and animal material is decomposed by micro-organisms in oxygen-free conditions within a controlled environment. The breakdown process produces biogas which is made up of 60% methane and 40% carbon dioxide. This can be burnt to generate heat or electricity. The burning of biogas releases carbon into the atmosphere. As the carbon comes from plant matter that originally captured the carbon from the atmosphere the process is considered to be carbon neutral.

2.3.2 Anaerobic digestion can be used to process food waste, energy crops, crop residues, slurries and manure that can originate from our homes, supermarkets, industry and farms leading to less waste being taken to landfill. The fuel for this process is referred to as 'feedstock'. The material left over at the end of the process, known as 'digestate', is rich in nutrients and can be used as fertiliser. Further information about anaerobic digestion is available from the Anaerobic Digestion and Biogas Association, the Environment Agency and the Suffolk County Council Waste Core Strategy (2011).

2.3.3 Considerations for an anaerobic digestion facility include:

- Emissions: Pollutants may be released into the air and local waterways.
- Landscaping: AD plants can be prominent structures in the landscape. These schemes can potentially be quite tall and in the context of Waveney's predominantly flat landscape may be visually intrusive. An AD facility will have a lesser impact on the landscape if located near existing farm buildings or an existing industrial area. As part of a landscaping scheme, there may be opportunities to consider how tree planting could be used to improve the setting of the proposed facility and existing buildings within the landscape.

Anaerobic digestion plant, Eye

- Odour: Can arise from waste input storage bays, waste sorting and mixing, opening of the facility for cleaning, removal of the digestate.

- Transport: Additional traffic may be created if feedstock or digestate is sourced or redistributed to/from an off-site location. Traffic flows in the wider area may not be significantly affected but local roads may experience an increase in the amount of HGV traffic.

2.3.4 Whilst not a planning consideration, developers should seek to ensure that a secure fuel source(s) is available over a long period of time. Sourcing fuel locally will increase the sustainability of the scheme and will be encouraged. The same applies for biomass energy generation discussed in the following section.

2.3.5 Proposals for anaerobic digestion facilities may require a standard or bespoke environmental permit depending on the nature of the proposal. The Environment Agency can provide further information.

Waveney Example: Adnams plc

Adnams / Bio Energy: As part of a comprehensive business strategy, Adnams plc in conjunction with Bio Energy is creating a multi-technology energy facility located within the Suffolk Coast and Heaths AONB near Southwold. This includes an anaerobic digestion plant that generates energy using biowaste created by the brewing process on site as well other local sources. The biogas produced is used to power facilities on site including vehicles and it is also exported to the national grid. In addition to the AD facility is the installation of 962 photovoltaic cells.

Adnams brewery distribution warehouse: The Adnams plc brewery distribution centre is a BREEAM 'excellent' rated building with a floor space of 4400m2. Key features of the building include:

- *a 6000m2 green roof that supports sedum, wildflowers, wild grasses reduces water run-off and provides insulation;*
- *roof overhangs and window screening (brise-soleil) restricts unwanted sunlight;*
- *walls are constructed of hemp and lime blocks instead of concrete reducing carbon emissions during construction;*
- *wooden beams that span the internal space eliminating the need for internal supports therefore increasing the adaptability of the space;*
- *solar thermal panels supply hot water;*
- *rainwater harvesting for flushing toilets and washing vehicles;*
- *movement sensors for lighting, and buffer zones to maintain appropriate levels of ventilation and heat loss.*

The building has been integrated into the landscape, the environmental footprint was reduced during construction, the cost of energy and water on site has been reduced and future-proofed against likely price rises.

Biomass

2.3.6 Biomass can be used for bio-fuelled boilers, biodiesels and biogases to generate electricity and heat in a similar way to traditional fuels such as coal, oil or gas fired boilers or traditional stoves. Biomass boilers are slow to respond to fluctuations in heat demand and are better suited to a steady energy load. There are no overall energy savings when using biomass boilers but the amount of carbon released during combustion is similar to that captured naturally during the lifetime of the plant.

Anaerobic digestion plant, Thetford

2.3.7 Bio-fuelled boilers can use wood chips, wood pellets or wood waste streams as fuel. These can originate from bio-crops such as miscanthus, or short rotation crops such as coppice and straw or left over wood from forestry or industry. A biomass boiler using waste wood as a fuel may need to comply with the Waste Incineration Directive. These requirements will depend on the type of fuel being used and the thermal characteristics of the scheme. It is recommended the Environment Agency or the Local Authority be contacted early in the planning application preparation process to discuss any permit requirements.

2.3.8 The Energy Opportunities Map shows that much of the District could contribute towards biomass as a fuel either through the growing of energy crops or forest management. In Waveney there is approximately 1900ha of woodland, of which approximately half is not currently managed. Whilst not a planning consideration, land classified as grades 3b and 4 is considered most appropriate for growing energy crops. The best agricultural land is categorised as Grades 1, 2 and 3a and whenever possible should be used for food production rather than energy crops.

2.3.9 Considerations for a facility using biomass fuel include:

- Economic benefits: Securing long-term income for farm related workers.
- Emissions: Potential for adverse impacts on health, ecology or conservation from air and waterborne emissions.
- Fuel storage: Storage space can be indoors, outdoors, above or below ground level depending on the characteristics of the site and its surroundings. This should be identified as part of the scheme design.
- Location: Large-scale biomass boilers, or the cumulative impact of biomass boilers, in built up areas can result in an increase of nitrous oxide emissions. This is a particular concern in central Lowestoft where nitrogen dioxide concentrations at Belvedere Road, Mill Road and Pier Terrace (i.e. in the vicinity of the Bascule Bridge) are only just below the National Air Quality Strategy Objectives. It is recommended that early contact be made with the Council's Environmental Protection Team to discuss proposals.
- Noise: May originate from traffic and plant operations.
- Transport: Additional traffic generated by fuel deliveries and removal of bi-products. Sourcing fuel locally will reduce environmental impact of the scheme. As a rule of thumb, two 38 tonne lorry deliveries per day per MW are required to provide continuous energy.

- Visual intrusion: Proposals may involve permanent structures and a chimney may be required to release heat creating a plume. The landscape in Waveney is relatively flat and development in built up areas is generally low level. Visual impact will need to be assessed based on characteristics of the site.

District heating and combined heat and power

2.3.10 District heating and combined heat and power (CHP) is a network of insulated pipes used to deliver heat in the form of hot water or steam from the point of generation to the end user. This is an efficient way to transfer heat and reduce the total energy demand. The boiler can be fuelled using biomass or biogas to reduce carbon emissions.

2.3.11 These schemes are more efficient where there is a mix of different uses and there is no single part of the day where energy demand is highest. Reducing peaks and troughs creates a more constant energy demand that places less stress on the energy generation facility. As a guideline for housing, this technology is best suited to medium-high density developments typically in excess of 50 dwellings per hectare. Private home owners have a choice of energy types and suppliers and may or may not choose to partake in a district heating scheme. This could affect the viability of a proposal.

2.3.12 It is important to understand the energy demands of the local area. Residential usage is highest during the morning and evening, whereas commercial users have peak energy use during the day. Energy demand is lowest in summer and a CHP generator should be sized to this level of demand as the base load. Additional demand can be met through back-up boilers that switch on as necessary. In Waveney, the most feasible location for a district heating system is likely to be in the Kirkley Waterfront and Sustainable Urban Neighbourhood (SUN) area which lies on the south side of Lake Lothing in Lowestoft. Proposals for this area include a mix of residential, employment and community uses that will be of a density that could support such a technology. Further detail about the site is available in the Sustainable Urban Neighbourhood and Kirkley Waterfront Development Brief.

2.3.13 Key to a successful heat network are 'anchor loads'. Anchor loads are buildings that use large, relatively steady amounts of energy over time such as hospitals, hotels, leisure facilities, retirement and care facilities. Small-scale CHP could be part of a smaller network or one that could be expanded over time. This type of approach may be more suitable for sites, such as the SUN, that are brought forward in a series of phases.

CHP plant, UEA, Norwich

2.3.14 Smaller schemes such as building-scale networks could be considered where a proposal would require a relatively steady energy demand that could be linked with some new or existing homes and businesses. Potential schemes may be feasible for supermarkets and care facilities.

2.3.15 Considerations for a district heating network or combined heat and power system include:

- fuel storage;
- future proofing (possible expansion of the network and providing connection points in new buildings to be connected at a later date);

- height of the buildings;
- land availability for the fuel generation plant;
- landscape impact;
- length of the pipes and size of the network (locating energy generator as close to customers to minimise length of the pipe network);
- opportunities to combine heat and cooling on the same network;
- phasing of the development;
- pollution dispersion;
- energy efficiency of buildings that will or could be connected to the network.

2.3.16 Planning permission will be required for the construction of any boiler house, fuel stores, flues and underground piping but not for the installation of a heat exchanger. Where the installation of a district heating or combined heat and power system is part of a new development (as opposed to retrofitting an existing development), details are to be submitted with the detailed planning application.

2.3.17 District heating networks require a significant capital outlay. These costs are recouped over time as users connected to the network pay for the energy they use. To assist with the implementation of these schemes Energy Service Companies (ESCo) may be able to provide support. ESCos can also provide an opportunity to deliver other types of low carbon or renewable energy schemes. This is further discussed in Appendix 6.

Suffolk Example: Snape Maltings

Snape Maltings is a Grade II listed site located within the Suffolk Coast and Heaths AONB. A biomass heating system was installed to provide heating to 66 residential properties and 9000ft2 of retail space on site. The heating biomass system is located within a purpose built boiler house. It is fully automated and distributes heat to buildings on site using a network of underground insulated piping. The fuel, wood chip, is sourced locally and kept in an underground store adjacent to the boiler house. All properties are individually metered to monitor the heat they use. The district heating system is complemented by solar panels that have been installed on the roof of the new boiler house.

2.3.18 The Town and Country Planning Association (TCPA) has published guidance relating to district heating and CHP titled 'Community Energy: Planning Development and Delivery'. The Combined Heat and Power Association can also provide information about community energy schemes.

Large-scale photovoltaics

2.3.19 Large-scale photovoltaic arrays or 'solar farms' are considered to be installations with an installed capacity of 50kW or greater. They use the same technology as solar panels installed on buildings. Solar panels are free-standing on a metal frame, usually at a height of about 2-4m. These frames can be removed after use and the land restored to its original condition. The structures are usually aligned in a parallel sequence with a gap between these lines to enable access. The lifespan of this technology is about 25 years.

2.3.20 This technology is most suited to gently sloping terrain with a southerly aspect. Steep slopes are more likely to increase intrusion into the landscape and should be avoided. A number of areas within Waveney are recognised for their local landscape sensitivity and discussed in the Waveney Landscape Character Assessment. These include (but are not limited to):

- the landscape adjacent to (Waveney Valley) and within the Broads Executive Area;
- Hundred River Valley inland from Hulver Street;
- Blyth Valley around Halesworth and Holton;
- Suffolk Coast and Heaths AONB.

2.3.21 Other structures required to support a large-scale solar PV array include temporary storage compounds, inverters to convert electricity into a usable form which may be housed in a new or existing structure, a transformer and underground power lines, security fencing and planting to screen the development.

2.3.22 Considerations for a large-scale solar array include:

- Agricultural land: Stand-alone solar PV arrays do not render land non-productive in the same way housing does. These installations are raised above the ground which is likely to reduce productivity, however, a limited amount of grazing may be a possible. A developer should demonstrate they have considered agricultural uses on the site while in use as a solar facility. Land of poorer quality should be used in preference to that of higher quality. The best and most versatile agricultural land is classified as grades 1, 2 and 3a. These classifications are based on soil type and not productive value. For example, an area of agricultural land may be of high quality but have surface drainage issues which might render the site unproductive. A map of the distribution of agricultural land in Waveney is shown in Appendix 5 (this map does not represent the sub-classifications of land graded 3a and 3b). Establishing the agricultural land grade will assist with demonstrating the appropriateness and benefits of a proposed scheme.

Solar farm, North Walsham

- Archaeology: The installation of frames may impact upon underground archaeology. Sites suitable for solar array schemes such as gentle slopes and valleys tend to have higher potential for archaeological assets to be found.

- Biodiversity: Hedges to mitigate the visual impact of an installation, particularly along the boundary and security fencing. Frames for solar panels sit above ground level and provide opportunities to enhance biodiversity through the creation of new habitats. A landscaping and maintenance plan can identify how the proposal could enhance the site and environment.

- Heritage assets: Large solar PV arrays can increase the perceived human influence on the environment. This may be particularly important in areas that are remote and open or may contain structures with heritage value. The setting of a heritage asset must also be considered. PV arrays should respect the historical layout of the land.

- Landscape: A Landscape Visual Impact Assessment (LVIA) should be carried out which assesses the potential impact on the area. The LVIA should show potential impact upon key views, landscape character, sensitivity, tranquillity, the historic environment and the public enjoyment of these qualities. Potential impact resulting from glint and glare and visual impact associated with proposals will need to be assessed alongside mitigation measures that may be needed. Schemes in flat landscapes are likely to be less visually intrusive than valleys and hills that are more likely to be overlooked or exposed. Structures may look out of place in landscapes with high landscape or ecological value such as the AONB or the Broads. The Waveney Landscape Character Assessment should be used as the baseline for any assessment. The Broads Landscape Sensitivity Study for Renewables and Infrastructure identifies the appropriateness of photovoltaic developments within the Broads and adjacent areas.

  Planting should be considered as part of a scheme to reduce the visual impact of a development and enhance biodiversity. Planting schemes should ideally use flora indigenous to the area and complement existing species and vegetation patterns. Strengthening existing hedgerows will improve visual amenity and enhance biodiversity corridors. Consideration should be given to how long planting will take to mature. When solar array schemes are laid out space enough space should be left to increase the likelihood that planting will be successful.

Solar farm, Reydon

- Cumulative Impact: Several large-scale developments in close proximity to each other may look out of place in the landscape and have an adverse impact on important and historical views across the landscape as well as the character of the area. Clustering is most likely in locations where a grid connection is available.

  The proximity of large solar farm proposals to each other that are either in operation, under construction, have been granted planning permission or are subject to a full planning application should all be considered in the context of visual and landscape cumulative impacts. The landscape in Waveney is relatively flat with shallow valleys and undulations which have created enclosed landscapes in many areas. Further information about assessing cumulative impacts is set out in Government guidance entitled ‘Planning practice guidance for renewable and low carbon energy’.

- Noise: Transformers located on site may generate noise while in operation. Consideration should be given to the amount of noise generated, either independently or cumulatively and the hours at which this noise is present.

- Public Rights of Way: Public access to the countryside should be maintained and mitigation measures used to minimise the impact on amenity.

- Reflection: Solar panels are designed to absorb, not reflect, radiation and the potential impact of glare should be considered in the context of landscape character, wildlife and aviation activity. The cumulative reflective quality of all materials used in the construction of solar farms (solar panels, frames and supports) should be assessed.

- Restoration: A restoration strategy should set out how the site will be returned to its original condition.

- Security: Equipment will need to be adequately protected. Measures should be of a minimum height and sensitively designed to fit into the surroundings. This may include security fencing, infrared cameras and CCTV.
- Site Access: The installation of access tracks should be kept to a minimum. Agricultural vehicles, quad bikes and four wheel drive vehicles should be capable of servicing facilities on site without the need to construct access tracks.

Energy from waste

Combustion

2.3.23 A significant amount of municipal solid waste gathered from domestic and commercial sources is taken to landfill. Direct combustion (incineration) can be used to reduce the volume of stored waste and the heat used to export energy to the national grid. To be viable these facilities need to achieve economies of scale therefore any proposal will be significant. From 2014, residual waste from Waveney will be transported to a facility in Great Blakenham, Suffolk. The facility will be capable of supplying 20MW of electricity to the national grid.

Energy from waste facility, Great Blakenham

Landfill gas

2.3.24 Landfill gas is created through biological breakdown of material in the landfill. Gas is drawn from the fill through a series of pipes to an extraction plant where it can be purified to be used to generate heat or electricity. In Waveney, the landfill at Wangford has the capacity to generate approximately 1MW of energy. Gas generation in a landfill will decline over time due to the stabilisation of the waste. The contribution of landfill gas towards the energy network is also likely to decrease over time as the amount of waste going to landfill is reduced through actions such as increased recycling. As a finite resource, landfill gas is not considered to be renewable, however, it does contribute to the energy mix in the District.

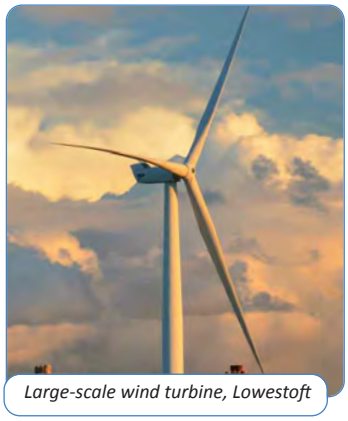
2.3.25 For developments that propose energy to be generated from waste, the following should be considered:

- Fuel source: Ideally a fuel source will be located close to where the energy is generated to reduce costs and carbon emissions (this, however, is not a planning consideration).
- Grid connection: Close proximity to the grid connection will reduce infrastructure investment costs.
- Landscape: Impact on the character of an area, local amenity, the appropriateness of a location and measures to reduce visual impacts.
- Pollution: Control and dispersion of pollution including air, water, noise and odours, including the requirement for a possible chimney stack. Information about emissions is available from the Environment Agency.
- Traffic: Additional vehicular activity that may be generated and the hours at which this is likely to occur.
- Site selection: These proposals are most appropriately located away from housing for amenity and safety.

2.3.26 Planning application queries for landfill gas should be directed to the local waste authority, Suffolk County Council. The Authority will determine applications in accordance with the adopted Waste Core Strategy.

Medium and large-scale wind turbines

2.3.27 The most widely available energy resource in Waveney is wind. The average wind speed at a height of 45m is greater than 5.9m/s. This is above the threshold of 4.5m/s which is needed to ensure a wind turbine can operate efficiently. Wind turbines are most efficient when operating in wind speeds greater than 7m/s. Wind turbines convert the kinetic energy in the wind into electricity using its natural power to drive a generator.



Large-scale wind turbine, Lowestoft

2.3.28 Wind energy technology can be the most intrusive of the large-scale technologies and proposals can be controversial. It is essential to address the feasibility and constraints early in the planning process. Large-scale turbines are considered to be those with an installed capacity of 50kW or greater. Medium-scale wind turbines are considered to be of a height between 15-50m (ground level to tip of the turbine blade). Further information about wind turbines is available from organisations such as RenewableUK and the Renewable Energy Foundation. Scottish Natural Heritage has produced several guidance documents discussing wind turbines of all sizes that are often applied in England.

2.3.29 When investigating the potential of a site for wind power an applicant should consider the following:

- Aeronautical interference: Wind turbines can interfere with the operation of aeronautical, defence equipment and support systems such as radar. Radar technology is unable to differentiate between rotating turbine blades and an approaching aircraft which poses a problem for air traffic control and navigation aids. Turbines can also present a physical obstruction to safe operations at local aerodromes such as Ellough. Applicants should consult with the Ministry of Defence if a proposed wind turbine is 11m or taller (ground to blade tip) or has a rotor diameter greater than 2m. The National Air Traffic Services (NATS) can provide additional further information as a statutory consultee.

- Environment: Wind turbines should avoid locations within or adjacent to statutory nature conservation areas or protected landscape designations. Applicants are required to demonstrate their proposal will not compromise the objectives of any environmental designation. As part of considering an application, the Council will consult Natural England, English Heritage and the Environment Agency.

  Waveney's environment supports a diverse variety of resident and migrating birds and bats. Potential collision risks are increased by turbines being located in close proximity to habitats, migration routes and feeding and roosting grounds. A desk based assessment using bird and bat data and an appraisal of habitats and species will be required to determine what additional survey work may be required. It is recommended that the applicant establish

Large-scale wind turbines, Kessingland

early contact with the Royal Society for the Protection of Birds (RSPB). Guidance about wind farm development and nature conservation has been published by English Nature, the RSPB, the World Wildlife Foundation (UK) and the British Wind Farm Association titled 'Wind farm development and nature conservation' (2008) and Natural England in 'Bats and Onshore Wind Turbines' (2012).

Large-scale wind turbines, Somerton

- Flood risk: Wind turbines are classified as essential infrastructure and a flood risk assessment (FRA) will be required for development in flood zones 2 or 3 and development of over 1 hectare in flood zone 1. Infrastructure classified as 'essential' in guidance published by the Government entitled 'Technical Guidance to the National Planning Policy Framework' (DCLG, 2012) is considered acceptable in flood risk zones 1 and 2 but this remains dependent on the outputs of the flood risk assessment. Wind turbines themselves may be less affected by flood issues, however, careful consideration should be given to the siting of associated infrastructure (eg. sub-station, converter station) in a flood risk area. A sequential approach as set out in the Technical Guidance to the NPPF should be adopted for the more flood sensitive parts of the development where applicable (eg. substations). A 'flood defence consent' issued by the Environment Agency is required if there are any works within 9m of a main river or a formal flood defence. Works affecting ordinary watercourses will require the consent of the lead flood authority (Suffolk County Council). Further information about flood risk in the District is available in Waveney's Strategic Flood Risk Assessment (WDC, 2008), as amended by the Cumulative Land Raising Study (WDC, 2008).

- Grid connections: This infrastructure is needed to transfer energy from the source into the network for use. Some areas of Waveney have limited grid connections which may present a significant barrier to the installation of a wind turbine and the distribution of the energy generated. It is recommended the applicant consult National Grid to identify any issues that may be present and how these could be resolved.

- Infrastructure: Roads, railway lines, Public Rights of Way and/or, other forms of infrastructure including wastewater (including easements) and power cables located above and below ground need to be taken into account to ensure adequate protection and access is maintained. In some instances it may be possible to consider diversion of assets if necessary. It is important to consider the position of existing infrastructure at the initial stages in the process and engagement with the appropriate body responsible for the infrastructure. The accessibility of a site will need to be considered, particularly where there is a need to construct a new access or where there may be damage to an existing Public Right of Way.

- Landscape: A Landscape and Visual Impact Assessment (LVIA) will be required to identify if a wind turbine is likely to impact upon sensitive assets such as landscape features, landscape character, heritage assets and visual amenity including views into and out of the landscape. Information about the District's landscape character is set out in the Waveney Landscape Character Assessment (WDC, 2008). This is an important evidence base to inform the potential impact of a development proposal on an area. Where proposals are located near Waveney's northern and western administrative boundaries further information about the suitability of wind turbine development is available in the

'Broads Landscape Sensitivity Study for Renewables and Infrastructure' (Broads Authority, 2012) and the 'South Norfolk District Wind Turbine Landscape Sensitivity Study' (South Norfolk District Council, 2006).

Large-scale wind turbine, Kessingland

The LVIA should take in an area appropriate to the height of the turbine. This area around the proposed site is referred to as the 'zone of theoretical visibility' (ZTV). 'Visual Representation of Windfarms: Good Practice Guidance' (Scottish Natural Heritage, 2006) states that for turbines with a total height up to:

> 50m, use a ZTV of up to 15km;
> 100m, use a ZTV of up to 30km;
> 130m, use a ZTV up to 35km.

Photographs should be used to illustrate the proposed location of the turbine and annotating any specific features evident from the view point. The view points should be agreed between the applicant and the Local Planning Authority. Photomontages should be prepared in accordance with 'Photography and photomontage in landscape and visual impact assessment' (Landscape Institute, 2001) and the 'Visual Representation of Wind farms: Good Practice Guidance' (Scottish Natural Heritage, 2006) or their updates.

- Cumulative impact: Cumulative landscape impact may result where the landscape no longer has the capacity to incorporate new developments without altering elements and character of the area and detrimentally affecting the quality of the landscape.

  The proximity of wind turbine proposals (of all scales) to each other that are either in operation, under construction, have been granted planning permission or are subject to a full planning application should all be considered in the context of potential visual and landscape cumulative impacts. The landscape in Waveney is relatively flat with shallow valleys and undulations which have created enclosed landscapes in many areas.

  Cumulative visual impact may result from the inter-visibility between wind turbine installations when they are viewed at the same time or by rotating at the same vantage point or when viewed from different locations along a route which may change the character and quality of an area. The overall scale and design features (such as height, rotation speeds, blade overlap) will contribute to the cumulative visual impact. Further information about assessing cumulative impacts is set out in Government guidance entitled 'Planning practice guidance for renewable and low carbon energy'.

- Noise: A noise assessment is required to ensure turbines will not have an adverse impact on local residences or any protected area. Noise can be created mechanically by operating components of the turbine such as the gearbox or by the aerodynamics of the blades as they rotate through the air. To comply with noise regulations, noise measurements are not to exceed 42dB at a distance of 1m from the façade of any neighbouring building for a continuous period of 5 minutes for 10% of the operational time. Good practice guidance for assessing noise related to wind energy developments is set out in 'The Assessment and Rating of Noise from Wind Farms' (BIS, 1996) and 'A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise' (Institute of Acoustics, 2013).

Amplitude modulation noise is experienced by an observer as a variation of sound levels generated by the wind turbine. This can be in the form of a 'swish' which is related to a person's position relative to the turbine or as a 'thump' which is sensed as a pulsing sensation. This 'thump' is primarily caused by the variation of wind speeds at different heights (known as wind shear) as the turbine blades rotate through air with even velocities. This could have a significant impact on residential amenity but is difficult to predict. Wind shear is a phenomenon commonly associated with weather systems and topography. In coastal areas such as Waveney, sea and land breezes develop which can interact with faster winds that originate out to sea as they flow onshore. Potentially, this can increase the atmospheric conditions needed for wind shear to occur. Amplitude modulation should be addressed as part of a noise assessment.

The distance a turbine is away from a building will directly affect the potential noise impact on its occupants. When assessing the potential noise impact of a turbine considerations should include (but not limited to) the orientation of the building, the amount of glazing on the surface facing the turbine and, should another turbine be located in the vicinity, the potential cumulative effect of noise. The same considerations should be applied when considering shadow flicker.

- Restoration: A restoration strategy should demonstrate how the site will be returned to its original condition.

- Seascape: The coastal zone is a defining characteristic of Waveney District and impacts similar to those discussed under the sub-title of 'Landscape' should be considered.

- Separation distances: The Government advises against setting minimum separation distances or buffers between residential dwellings and turbines, considering them inflexible. Proposals for wind turbines will be assessed on their own merits to ensure there are no significant adverse impacts or cumulative adverse impacts on the landscape, townscape, historic features and local amenity for nearby residents. Where proposals are likely to have an impact on the landscape, townscape or amenity it should be demonstrated there are no other sites considered to be more appropriate.

Large-scale wind turbines, Somerton

There is no specific requirement about how far away a turbine should be from roads, footpaths and byways. However, based upon Government guidance and engagement with local stakeholders a distance equivalent to the height of the turbine (base to tip of the blade) plus an additional 10% of this height is generally considered acceptable in Suffolk.

- Shadow flicker: This occurs when the blades rotate in front of the sun creating a flickering shadow. Only properties within 130 degrees either side of north relative to the turbines would be affected. There is no standard assessment of shadow flicker and no guidelines are in place that quantify exposure levels that would be considered acceptable. However, the number of hours shadow flicker may occur can be calculated and regulated through a control mechanism. Shadow flicker should be kept to a minimum to reduce impact on amenity.

Shadow flicker is dependent upon a number of factors including; the direction of the observer from the turbine, distance away from the turbines, hub height and rotor diameter, time of year, proportion of daylight hours in which the turbine operates, frequency of sunny and cloudy days and the prevailing wind direction. Flashing caused by reflected light can emanate from a rotating turbine but can be ameliorated by a careful choice of colour and surface finish. Shadow flicker can create a disturbance for road users. Consultation with the Highways Agency and Suffolk County Council Highways is recommended.

- Wind: A wind assessment of a site will need to be undertaken using historical meteorological data and data acquired on site. This should be obtained using anemometers taking measurements at an appropriate height over a duration of time (usually a period of at least twelve months). This will assist with determining if a site is suitable. The mast should be of a height equivalent to the hub of the proposed turbine. Planning permission will be required to install a temporary anemometer mast.
- Wireless communications: Terrestrial radio and television broadcasting, mobile phone connections and other wireless networks may be affected by wind turbines. OFCOM has published guidance entitled 'Tall structures and the impact on broadcast and other wireless services' which may be useful and should be consulted where a proposed wind turbine is taller than 15m.

Waveney Example: Lowestoft Ness (Gulliver)

The wind turbine located at Lowestoft Ness has been in operation since January 2005. At a height of 126m from the base to the blade tip this was the first large-scale wind turbine operating in Suffolk and has an installed capacity of 2.75MW. This is enough electricity to supply in excess of 1500 homes and save over 6000 tonnes of carbon emissions annually. Located next to OrbisEnergy, a centre for renewable energy excellence, Lowestoft provides a hub for renewable energy research and development.

Waveney Example: Denes High School

As part of a programme to make the school more sustainable by 2015, a 5kW medium-scale wind turbine was installed at the Denes High School in 2010. Led by students attending the school, an initiative to reduce carbon emissions and energy costs was undertaken. This involved energy audits, consideration of alternative energy sources and presentations to external groups. The technology provides 3-5% of the school's energy needs, reduces the schools carbon emissions by 40 tonnes a year and data obtained from the turbine is also used for academic purposes.

Offshore wind turbines and ancillary infrastructure

Offshore wind turbine applications

2.3.30 Where offshore wind turbines are proposed in the vicinity of the Waveney coastline, the District Council is not responsible for determining the planning application but is a statutory consultee. Offshore wind farm applications and any licensing requirements for proposals greater than 100MW are Nationally Significant

Infrastructure Projects and are considered by the Planning Inspectorate with the final decision being made by the Secretary of State for the Department for Energy and Climate Change.

Offshore wind turbines, Great Yarmouth

2.3.31 Schemes of less than 100MW including licensing, are decided by the Marine Management Organisation (MMO). The Marine Plan applies to proposals up to the spring high water mark and is a material consideration in planning and licensing decisions considered by the Planning Inspectorate and the MMO.

Ancillary Infrastructure

2.3.32 Energy generated by offshore wind turbines needs to be transferred to the onshore energy grid. This requires the installation of ancillary infrastructure which may include sub-stations, transformers, above ground and underground cables, pylons and additional investment in the local transport network.

2.3.33 New high voltage overhead lines are classified as Nationally Significant Infrastructure Projects. The Secretary of State for Energy and Climate Change is responsible for making planning decisions relating overhead power lines, however, it is a requirement that Local Planning Authorities be consulted.

Sub-station, Bramford

2.3.34 Potential economic, environmental and social impacts should be considered in accordance with the Local Development Framework as would be done with any other planning application. Sub-stations and transformers can affect the character of a localised area, however, above ground power transmission lines and pylons can significantly impact upon urban areas, landscapes and wildlife habitats across large expanses of land that cross District boundaries.

2.3.35 Suffolk County Council and Waveney District Council advocate the undergrounding of power transmission lines. A similar position is held by neighbouring local authorities. Undergrounding has environmental impacts, however, these are likely to be less significant than above ground cables and pylons. Protected areas such as the AONB and the Broads Authority are particularly vulnerable to impacts on the character of these areas. The installation of underground power lines is classified as permitted development and does not require planning consent.

What is an Environmental Impact Assessment?

2.3.36 An Environmental Impact Assessment (EIA) is used to identify how a proposed development will affect the environment during its construction and operation. An EIA will be required for certain renewable energy projects which exceed Column 2 of Schedule 2 of the Statutory Instrument 2011/1824. The developer is responsible for undertaking an EIA for their scheme if one is needed. The Council will use a screening process to determine if an EIA is required.

2.4 What Types of Micro-Generation Energy Technologies Are Appropriate for Households and Commercial Buildings?

2.4.1 Small-scale technologies such as solar PV, solar thermal, heat pumps and wind turbines can generate energy to meet some or all of the needs of a building. A single installation will produce a limited amount of energy but cumulatively these technologies will make an important contribution towards securing the District's future energy supply, reducing energy costs for households and businesses and assisting in the delivery of Policies DM03, DM04 and DM05. The Energy Savings Trust can provide guidance on energy efficiency measures and small-scale energy generation technologies.

Solar panels, Lowestoft

Permitted Development

2.4.2 Some alterations to buildings such as the installation of small-scale renewable energy technologies can be made without needing to apply for planning permission. These are called 'Permitted Development Rights'. Permitted development rights vary depending on the type of building (eg. house, flat, maisonette) and where the site is located. Restrictions are placed on permitted development if the building is listed or located within a protected area such as a Conservation Area, AONB or the Norfolk and Suffolk Broads. The tables in the following section set out where planning permission is required. However, to clarify if permitted development rights are applicable to a proposal the Local Planning Authority should be contacted.

Photovoltaics (PV)

Solar panels, Whitton Community Hall

2.4.3 There is significant potential for domestic-scale solar installations to contribute towards energy supply in Waveney with most south facing roof space having potential to support PV technology. The more energy that is generated through domestic installations the less justification there is for large-scale schemes such as wind turbines and solar arrays to be installed locally. Photovoltaic panels work on a principle of converting sunlight into electrical energy. These can be installed above the roof, integrated into the roof tiles or installed as a free-standing array within the grounds of a building. PV technology can also be applied through window glazing but this technology tends to be more expensive.

2.4.4 This technology works most effectively on south-east to south-west facing roofs and can be installed on any roof slope (optimal angle is 30 degrees). PV cells will continue to produce energy when overhead conditions are overcast but not as much as when the sun is out. Energy will only be produced when it is daylight, therefore, the energy must either be consumed, stored using batteries or sold to the electrical grid as it is generated.

2.4.5 Attention should be given to potential shading caused by trees, nearby structures or parts of the same building such as chimneys and dormer windows. If any solar panel within the solar array is shaded this could stop the system from operating properly. The planting of deciduous trees as part a landscaping scheme will provide shade for a building and reduce the need for cooling during the summer months while enabling maximum solar receipts during the winter when energy demand is highest.

2.4.6 A 1kW domestic PV array will generate about 750kWh of electricity per year. To meet the electricity needs of an average dwelling in Waveney a solar PV array of 6m2 would be needed.

2.4.7 Other considerations that apply to solar PV installations and other micro-energy generating technologies outlined in this section may include:

- The installation of an inverter linked to the fuse box to convert the electricity generated from direct current to alternate current for it to be usable.
- Free-standing technologies within the grounds of the property will need to be connected to the building by underground cabling which should be buried at least 0.5m below the surface to avoid damage.
- Where a building is connected to the electrical grid excess electricity can be sold to the grid when not required. Connection to the grid will also ensure a continuous supply of energy when not enough is being generated on site.
- Layout of the PV panels on the roof of a building to be in keeping with the character of the building, property and streetscape.

Solar panels, Reydon Primary School

Waveney Example: Promens Packaging Limited

Located near Beccles on the roof of a warehouse used by Promens Packaging Limited. The solar PV array consists of 7005 solar panels capable of generating 1.65MW of energy. As of 2011, this was the largest installation of its type in England. The roof space is leased to a company that operates the solar PV system and Promens saves money by purchasing energy from the operator.

Solar panels, Bungay

2.4.8 Table 2 sets out the planning requirements for micro-generation technologies in accordance with the General Permitted Development Order (GDPO) (1995, as amended). The Planning Regulations that apply to renewable energy installations and other small-scale developments are available on the Planning Portal. For a definitive view on whether planning permission is required please contact the Local Planning Authority.

Table 2 Planning requirements for solar PV installations

Planning permission for building mounted solar PV
If the property is rented permission and consent should be sought from the property owner. For residential dwellings and blocks of flats planning permission will not be required if the scheme meets the following criteria: • the solar panels are not above the ridge line and no more than 200mm from the roof or wall surface. For non-residential properties planning permission will not be required if the scheme meets the following criteria: • the solar panels are not above the ridge line and no more than 200mm from the roof or wall surface; • the equipment is installed more than 1m away from the external edge of the roof or more than 1m away from the junction of that wall with another wall or roof; • installations on a flat roof will not be more than 1m above the highest part of the roof (excluding any chimney). Planning permission/listed building consent may be required for any work carried out on a listed building that affects its character or setting. If the property is in a Conservation Area and the panels are to be fitted on a wall or roof slope fronting a highway planning permission will be required. If the property lies within a protected landscape planning permission may be required.
Planning permission for stand-alone solar PV
The installation of stand-alone solar panels will not require planning permission if the scheme meets the following criteria: • it is less than 4m in height; • it is more than 5m away from the property boundary; • the area of the array is less than 9m2; • there are not other stand-alone installations on the property. Planning permission/listed building consent may be required for any work carried out on a listed building that affects its character or setting. If the property is in a Conservation Area and the system situated between the property and the highway planning permission will be required. If the site is located within a protected landscape planning permission may be required.
Building Regulations
Part A Structure: The roof will need to be certified as being strong enough to hold the panel(s). Part P Electrical Safety: Once connected the electrical work will need to be certified.

Solar thermal

2.4.9 Solar water heating systems comprise of three main components; solar collectors (evacuated tubes or flat plates), a heat transfer system (fluid in the pipes) and a hot water store such as a hot water cylinder. Solar energy heats the water which is then transferred to the storage tank where it is kept until needed. It is then reheated by a conventional boiler to the required temperature ready for use. Space for a water tank will need to be considered before installing the system.

Solar collectors

2.4.10 The collectors, which is the equipment that captures the sun's energy to provide heat, are ideally positioned on a south facing roof on a 30 degree angle (this is not critical) in an area not subject to shading. The same principle can be applied to collectors that are free-standing in the curtilage of a property but additional work would be required to install piping to transfer the pre-heated water to a water store and the building.

2.4.11 Before mounting solar collectors onto a roof a structural survey will be required to ensure the building is strong enough to hold the additional weight of the collector and the support framework.

Solar panels, Bungay

2.4.12 An area of about 4m^2 is required for the collector. This should provide between 50-60% of the hot water demand for a typical home. The same planning requirements set out in Table 2 for solar PV installations apply to solar thermal systems.

Air source heat pumps

2.4.13 Air source heat pumps function in a similar fashion to a refrigerator but in reverse. The device absorbs heat from the air which is then used to heat water or internal spaces within a building. During the warmer months air source heat pumps can be reversed to be used as air conditioning units to lower internal air temperatures. There are two types of air source heat pump systems:

- air to air systems: take heat from the air outside and pass it into the building through fans;
- air to water systems: take heat from the air and direct it into the wet central heating system.

2.4.14 To be effective energy efficiency measures should be implemented before a heat pump is installed. If energy efficiency measures are not implemented then the additional heat generated by the heat pump will be lost making the system less cost effective.

2.4.15 Space will need to be set aside internally for a pump and tank. External space will be needed for the condenser unit (looks like an air conditioner). These blow out cooler air and can generate noise so they need to be appropriately located.

2.4.16 Installation near the window of a habitable room should be avoided. To be considered permitted development an installation must not create noise that exceeds 42dB at a distance of 1m from the window of a habitable room in the façade of any neighbouring residential property. Further information is available from the Energy Savings Trust.

Waveney Example: WDC housing upgrade programme

Waveney has over 4500 dwellings in its ownership. As part of a recent programme to improve energy efficiency, all properties with cavity walls and lofts have been insulated and double glazed windows fitted to properties not located in a Conservation Area. This was supplemented by low carbon and renewable energy technologies on site. This included solar PV installations on 10 sheltered housing schemes, 15 air source heat pumps, 80 air source heat pump/solar thermal combined systems and two solar thermal schemes.

Table 3 Planning requirements for air source heat pumps

Planning permission for air source heat pumps
The installation of an air source heat pump will not require planning permission if the scheme meets the following criteria: • there are no air source heat pumps or wind turbines on site; • volume of the outdoor compressor does not exceed 0.6m3; • the technology is at least 1m away from the property boundary; • the installation is not on a pitched roof and it is more than 1m away from the edge of that roof. Planning permission/listed building consent may be required for any work carried out on a listed building that affects its character or setting. If the site is in a Conservation Area and the heat pump is located on a wall facing the highway, is positioned in the grounds closer to the highway than the building, or is installed on a wall higher than the ground storey planning permission will be required. If the site is located within a protected landscape planning permission may be required.
Building Regulations
Part L Conservation of Fuel and Power: Consent for technology installation will be required. Part P Electrical Safety: Once connected the electrical work will need to be certified.

Ground (and water) source heat pumps

2.4.17 Ground (and water) source heat pumps can be used for space and water heating. These systems operate by drawing heat from the ground (or water) and transferring it to a heat pump. There are two types of ground source heat pumps:

- Closed loop systems - utilise a sealed pipe buried in the ground. Within the pipe is a continually circulating liquid which extracts heat from the ground. This type of system involves no physical interaction between the system and the environment.
- Open loop systems - use a borehole to supply groundwater to the system which is then circulated to extract heat from the ground. Once the water has passed through the heat exchanger it is then returned to the ground via a second borehole. An open loop system can impact on groundwater therefore the Environment Agency should be contacted prior to the installation of a heat pump.

2.4.18 A 1kW heat pump will require approximately 10m of piping. Piping set out in a parallel manner should be buried at least 1m below the ground surface and separated by at least 0.75m. Where space is limited pipes can be laid down in a coiled pattern. These should be installed at least 4m apart to operate effectively. The land area required varies depending on how easily the soil can transfer heat to the pump and how much energy the pump can generate. Horizontal piping is not appropriate for small properties. Alternatively, ground pipes can be laid vertically in the ground using bore holes. Digging is required to bury the pipe network which can be disruptive.

2.4.19 Ground source heat pumps are most effective for under floor heating. However, if radiators are used these should have a large surface area because the water heated by the pump is usually not as hot as the water heated by a conventional boiler. The Environment Agency can advise on the design and materials used as part of any proposal. They can discuss details of a proposal for an air or ground source heat pump system

and their appropriateness for a location if contacted early in the process when a scheme is being considered. Further information is also available from the Energy Savings Trust.

Table 4 Planning requirements for ground (and water) source heat pumps

Planning Permission for ground (and water) source heat pumps
Planning permission will not be required for the installation of a heat pump within the grounds of the dwelling. Other considerations are the same as set out for air source heat pumps.
Planning permission/listed building consent may be required for any work carried out on a listed building that affects its character or setting.
If the site is located within a protected landscape planning permission may be required.
Building Regulations
Part L Conservation of Fuel and Power: Consent for technology installation will be required.
Part P Electrical Safety: Once connected the electrical work will need to be certified.

Small-scale wind turbines

2.4.20 Small-scale wind turbines can be used to provide some or all of the energy needs of a building, however, it is critical that the position of the turbine is thoroughly considered for it to be effective. The efficiency of a wind turbine is not a planning consideration. Turbines are considered to be small-scale when they are of a size small enough to be attached to a building and the height does not exceed 15m above ground level, or if a stand-alone structure, of a height not greater than 15m. These heights are from the ground to the tip of the turbine blade. They should be located where the wind is above 4.5m/s to generate enough electricity to cover the capital cost. An assessment of average wind speed on site should be undertaken before installation. The Carbon Trust has a 'Wind Yield Estimator Tool' which can be used to assist with site suitability for wind in most areas.

Small-scale wind turbines, Henstead

2.4.21 Small-scale turbines can be attached to buildings using brackets fastened to an external wall or be free-standing on a pole. As a general principle, the higher the turbine the higher the wind speed and the greater the energy output. Urban locations are prone to air turbulence created by wind flowing around buildings, trees and other structures making small-scale turbines less effective in these areas.

2.4.22 When considering the height of a turbine there may be issues with visual amenity with turbines being visually intrusive to neighbours. Other issues to consider are noise, vibration and flicker.

2.4.23 There are two general types of small-scale wind turbines:

- horizontal axis wind turbines - have fast rates of blade rotation that may create higher pitched noise making it more intrusive. Turbines that have longer blades rotating at a slower rate are just as efficient at converting wind into electricity but are likely to generate less noise. Careful consideration should be given to the model of the turbine and the location where it is installed;

- vertical axis turbines - are relatively quiet and less susceptible to disturbed airflow. These can be used as a design feature in a development. They are less efficient than horizontal axis turbines at converting wind energy into electricity. A good wind turbine of 2.5kW is likely to meet most of the electricity needs of an average home. Medium-scale turbines up to 50kW are likely to be more appropriate for community uses and businesses.

2.4.24 The installation of a small-scale wind turbine may involve works that disturb roof spaces, chimney stacks and potential access points for bats. A survey may need to be undertaken to ascertain if bats are present. Guidance for wind turbines and bats is available from the Suffolk Wildlife Trust. If birds are present on the site, work should be undertaken outside of the bird nesting season.

Table 5 Planning requirements for small-scale wind turbines

Planning permission for building mounted wind turbines
The installation of building mounted wind turbines will not require planning permission if the scheme meets the following criteria: • there are no other building mounted wind turbines on site; • the installation is on a detached dwelling; • the turbine height does not exceed 3m above the highest part of the roof or an overall height of 15m and the blades do not reach a height of less than 5m above the ground; • no part of the turbine is within 5m of the property boundary; • the sweep area of the blades does not exceed 3.8m2. Planning permission/listed building consent may be required for any work carried out on a listed building that affects its character or setting. Planning permission will be required if the site is within a Conservation Area and the wind turbine is to be attached to a wall or roof slope which fronts a highway. If the site is located within a protected landscape planning permission may be required.
Planning permission for stand-alone wind turbines
The installation of stand-alone wind turbines will not require planning permission if the scheme meets the following criteria: • there are no other wind turbines or air source heat pumps on site; • wind turbines height does not exceed 11.1m; • no part of the wind turbine blade is lower than 5m above the ground; • no part of the turbine is within a distance equivalent to the height of the turbine plus 10% of the property boundary; • the sweep area of the blades does not exceed 3.8m2. Planning permission/listed building consent may be required for any work carried out on a listed building that affects its character or setting. Planning permission will be required if the site is within a Conservation Area and the wind turbine is to be installed closer to the highway than the building within the grounds. If the site is located within a protected landscape planning permission may be required.
Building Regulations
Part A Structure: For building mounted wind turbines the roof will need to be certified as being strong enough to hold the turbine. Part P Electrical Safety: Once connected the electrical work will need to be certified.

Biomass burners

2.4.25 Biomass burners (or stoves) and boilers are wood fuelled heating systems that use pellets, chips or logs. Stoves are generally used to heat a single room or level of a dwelling. Boilers are connected into a central heating network and can therefore be used to heat an entire building.

CHP generator fuelled by woodchip

2.4.26 Log burning stoves and boilers require a significant amount of wood to heat a dwelling. Wood chips are most suitable for a heating system that will heat multiple dwellings. Wood pellet burners and boilers generally use automatic fuel feeders which need to be refilled on occasion. Pellets burn for a longer time than logs but are more expensive.

Table 6 Planning requirements for biomass heating systems

Planning permission for biomass heating
Planning permission is not required if the installation of a flue is less than 1m above the highest part of the roof.
Planning permission/listed building consent may be required for any work carried out on a listed building that affects its character or setting.
If the property is in a Conservation Area planning permission will be required if the flue is to be installed on a wall or roof slope which fronts a highway.
If the site is located within a protected landscape planning permission may be required.
Building Regulations
Part F Ventilation: Certification is required to ensure there is enough ventilation to create a healthy and safe environment.
Part L Conservation of Fuel and Power: Consent for technology installation will be required.
Part P Electrical Safety: If the technology requires an electrical connection this will need to be certified.

Micro-CHP

2.4.27 A micro-combined heat and power system (micro-CHP) can generate heat and electricity for a large house, a block of flats or small commercial buildings. They can be a cost effective method of providing energy to a small-medium scale development that has a lower the impact on the environment. Typically a system to serve a development of this scale will be able to create between 5kW and 50kW of energy. It operates using a power source such as a boiler running on biomass or gas that generates electricity and heat. The captured heat is then pumped around the building for water and space heating. Potential air quality and noise impacts need to be considered. Buildings that have a relatively constant heating demand are most suitable for micro-CHP. To reduce energy loss during transfer these units should be located either in the building to be supplied with energy or in a separate building nearby.

Table 7 Planning requirements for micro-CHP systems

Planning permission for micro-CHP
Planning permission is not required if the installation of a flue is less than 1m above the highest part of the roof. Planning permission/listed building consent may be required for any work carried out on a listed building that affects its character or setting. If the property is in a Conservation Area planning permission will be required if the flue is to be installed on a wall or roof slope which fronts a highway.
Building Regulations
Part L Conservation of Fuel and Power: Consent for technology installation will be required. Part P Electrical Safety: If the technology requires an electrical connection this will need to be certified.

2.5 What Should be Considered if a Low Carbon or Renewable Energy Technology is Proposed on a Historic Building or in a Conservation Area?

2.5.1 The original purpose, style, height, profile, materials, details and views are important features in defining the character of heritage building(s), their setting and streetscapes. Potential impacts can result from the physical attachment of technologies or by the installation of free-standing equipment nearby.

Solar panels on a listed building, Halesworth

2.5.2 Physical alterations can result in the removal of historic fabric, the attachment of fixtures or the operational effects of equipment such as vibration and emissions. Free-standing equipment can impact on the setting of a historic building if it is located within the principal views to or from the building, or by interrupting spatial relationships with other buildings or natural features. Where equipment is to be installed in the curtilage of a site, existing outbuildings should be considered for housing or mounting equipment. Table 8 sets out some of the considerations that relate to small-scale low carbon and renewable energy technologies.

Table 8 Overview of planning considerations for small-scale low carbon and renewable energy technology installations

Technology	Considerations
Solar PV and Solar Thermal	Most appropriately installed on inconspicuous areas of a roof, such as the inner slopes of a roof valley, or where a flat roof is obscured by a parapet. Principal elevations should be avoided and consideration given to the appearance of the development in views of the building from higher vantage points. For the integrity of the building it is usually desirable to mount photovoltaic modules as panels over existing slates, rather than replace historic fabric with look-alike photovoltaic materials in the form of slates. This will also allow straightforward replacement or upgrade in the future.
Ground (and Water) Source Heat Pumps	Avoid damage to underground archaeology and the need to find an unobtrusive location for the pump equipment and any surface pipe work.
Air Source Heat Pump	Sensitive design and siting of the pump, its housing and associated cabling, ducting and other equipment are the principal considerations. Heat pumps distribute heat through under floor heating. This often requires the setting of heating coils in a concrete floor slab. This could potentially damage historic floors.
Biomass	Biomass stoves could bring original spaces for stoves, flues, fireplaces and chimneys back into use. If a new chimney or flue is required, it should be designed and located to be unobtrusive.
Wind Turbines	Building-mounted turbines have the potential to cause vibrations that could damage historic fabric. Visual impact through breaking of the building profile and movement of the blades.
Micro-CHP	Location of external structure to house CHP generator should be located and designed to fit in with the surrounds. CHP generator may create sound and vibration. If located internally, care should be taken not to affect internal living areas.

2.5.3 It is possible that archaeological resources survive within or beneath a historic building or place. The Suffolk County archaeologist should be contacted to ascertain the most appropriate way to manage archaeological issues, such as recording or preservation in situ.

Listed building consent

2.5.4 Listed building consent is required for any work carried out on a listed building that affects its character or setting. Where listed building consent is required, an application must be made to the Local Planning Authority. Permitted development enables property owners to install some micro-renewable technologies without planning permission, however, this does not apply to listed buildings or scheduled monuments. Where there is any uncertainty, it is advisable to contact the Council's Development Management Team for further information.

Article 4 directions

2.5.5 Article 4 directions are used to restrict permitted development rights to protect against inappropriate development in particular areas. Several of these are in effect in Waveney and these may restrict the installation of low carbon and renewable energy technologies in some circumstances. Further information about areas with heritage value that are protected by Article 4 directions are set out in the Built Heritage and Design SPD and can be accessed on the Council's Heritage and Conservation web pages.

Market based incentives for energy

2.5.6 To encourage greater energy efficiency in new and existing buildings and support the implementation of larger energy generation schemes financial incentives are available for some types of development. These incentives are available for domestic, community and commercial scale projects and will complement the savings associated with using less energy overall. Incentives include:

- Feed-In Tariffs (FITs);
- Renewable Heat Incentive (RHI);
- Renewable Obligation Certificates (ROCs).

2.5.7 To qualify for the Feed-In Tariff or the Renewable Heat Incentive the applicable technology must be installed by someone that is certified by the Micro-Generation Certification Scheme.

Sustainable Construction 3

3. Sustainable Construction

3.1 Policy DM04 Sustainable Construction

Policy DM04 – Sustainable Construction

All new residential developments in Waveney are required to meet full Code for Sustainable Homes standards or equivalent. These requirements will come into effect once successive updates to Part L of the Building Regulations become mandatory:

- At least Code level 3 will be required for all new homes from October 1st 2010
- At least Code level 4 will be required for all new homes once updates to Part L come into effect (currently scheduled for 2013).

All new schools or office developments in Waveney of equal or greater than 1000m2 gross floorspace are required to achieve the BREEAM "Very Good" standard or equivalent, with immediate effect.

Planning applications will require submission of interim Code for Sustainable Homes certificates or design stage BREEAM certificates as appropriate, in order to demonstrate compliance. Planning conditions will require submission of final Code certificates and post-construction BREEAM certificates, as appropriate. Conditions will not be discharged until compliance has been demonstrated in this way.

Both the Code for Sustainable Homes and BREEAM related requirements may be varied where it can be demonstrated that they are not feasible or viable.

3.1.1 New development, such as housing, commercial premises and schools provide a significant opportunity to deliver sustainable development. Waveney District Council's sustainable construction requirements set out in Policy DM04 are higher than national requirements set by the Government. However, the use of nationally recognised standards such as the Code for Sustainable Homes (CfSH) and the British Research Establishment Environmental Assessment Method (BREEAM) are intended to reduce the environmental footprint of new schemes.

3.1.2 For new residential developments, the Code for Sustainable Homes level to be achieved in Policy DM04 is intrinsically linked to the Building Regulations. The level of the Code which has a mandatory energy requirement equivalent to that required by Building Regulations is applicable. The energy requirement in the Building Regulations is scheduled to increase by 25% in 2013 and from this time CfSH level 4 will be applied. When this change takes place, extant planning permissions will still be required to achieve the requirements set out in the permission. An ‘equivalent standard’ is considered to be one that supersedes the existing CfSH or BREEAM and is endorsed by the Government.

How will Policy DM04 be applied?

What certification should an applicant submit to the Council for residential and non-residential buildings?

3..1.3 The aim of Policy DM04 is to deliver new buildings that demonstrate good sustainability credentials during their construction and lifetime. To achieve this, applicants are to demonstrate their new buildings comply with the Code for Sustainable Homes or BREEAM as appropriate. Policy DM04 requires the submission of interim certificates as part of a planning application as appropriate. Whilst the Council strongly encourages this approach it can be onerous for some developers. Therefore to make it easier to comply with the requirements the Council will accept planning applications without interim certificates. However, planning conditions will be used to ensure applicants will submit final CfSH/BREEAM certificates as appropriate.

3.1.4 The Council strongly encourages applicants to appoint a code assessor as early as possible in the design process. This will assist with maximising opportunities for sustainability and minimise the risk of not achieving code compliance. Not undertaking a pre-assessment may result in a developer retro-fitting their development and incurring unnecessary costs to discharge the planning condition. Not undertaking an interim or pre-assessment report is at the applicant's own risk.

3.1.5 Some policy requirements set out in the Core Strategy, Development Management Policies and the Lowestoft Lake Lothing & Outer Harbour Area Action Plan are higher than the standards required to achieve Code for Sustainable Homes or BREEAM compliance. For example, the provision of open space, consideration of flood risk, energy and water. Where local policy requirements are higher than that set out in the CfSH or BREEAM, these can contribute towards achieving code compliance.

What certification should be submitted to discharge planning conditions?

3.1.6 Applicants are required to submit a final Code for Sustainable Homes or BREEAM certificate (as appropriate) to the Local Planning Authority for each building before the last building on site is occupied. This will be required through a planning condition. For developments of more than one building, developers may wish to submit final certificates for more than one building at a time.

What if the proposal is not feasible or viable?

3.1.7 If the applicant considers the CfSH/BREEAM certification requirements not to be feasible or viable this should be clearly demonstrated to the Local Planning Authority.

- A pre-assessment or interim certificate will demonstrate if achieving the required code level is feasible.
- If considered not to be viable this should be demonstrated through open book accounting. The approach to be followed is set out in the Affordable Housing Supplementary Planning Document. A summary diagram of the planning process is set out in figure 14 on page 82.

What if the interim or pre-assessment report shows CfSH/BREEAM compliance is not possible?

3.1.8 If an interim certificate or pre-assessment demonstrates CfSH/BREEAM compliance cannot be achieved or will make the development unviable the Council will not require Code compliance to the standard set out in Policy DM04. It will, however, require compliance with the highest CfSH/BREEAM standard shown to be achievable in the interim or pre-assessment report.

What if the final certificates show that CfSH/BREEAM compliance has not been achieved?

3.1.9 If an applicant completes the building, does not achieve the CfSH/BREEAM level required and did not commission a pre-assessment report that demonstrated Code compliance could not be achieved, the planning condition will not be discharged. The applicant will need to consider measures that could be installed to achieve additional credits to demonstrate CfSH/BREEAM compliance. Compliance will need to be confirmed by a qualified code assessor. Once accepted by the Local Planning Authority the planning condition will be discharged.

3.1.10 Where a pre-assessment report has not been commissioned, additional cost associated with retro-fitting measures will not be accepted as justification for the applicant not to demonstrate Code compliance. However, if the applicant can demonstrate that CfSH/BREEAM compliance is unviable/unfeasible due to other constraints the Council will discharge the condition.

Who determines planning application for local authority schools, free schools and academies?

3.1.11 Planning applications for local authority schools are determined by Suffolk County Council. Free schools and academies are not part of the local authority education system therefore planning applications related to these facilities will be determined by Waveney District Council.

What if the planning application is for an extension of time of an existing consent?

3.1.12 Applications for an extension of time or renewal of an existing planning permission will be treated as a new application and therefore need to comply with the requirements set out in Policy DM04.

Table 9 Summary of building standard requirements and associated documentation to be submitted to the Local Planning Authority

Type of Development	Certification Requirements
Householder developments and conversions	Building Regulations
New residential buildings	Final CfSH certificate for the appropriate code level, completed by an accredited assessor, should be submitted to the Local Planning Authority prior to the final dwelling on the site being occupied.
Non-residential buildings that are not schools or offices	Building Regulations
Mixed use developments	For the residential element of a scheme a final CfSH certificate for the appropriate code level, completed by an accredited assessor, should be submitted to the Local Planning Authority prior to the final dwelling on the site being occupied. For the non-residential elements of a scheme these are to comply with Building Regulations.
Schools and offices with a gross floor space less than 1000m2	Building Regulations
Schools and offices with a gross floor space equal or greater than 1000m^2	Final BREEAM certificate, completed by an accredited assessor, should be submitted prior to the final building on site being occupied.

Construction Standards

3.1.13 By way of background, the following sections outline the Building Regulations, Code for Sustainable Homes and the British Research Establishment Environmental Assessment Method.

What are the Building Regulations?

3.1.14 Before a new building can be occupied it must comply with Building Regulations. There is no requirement for existing buildings to be upgraded to meet these standards, however, certain changes such as the use of a building or structural works may require Building Regulation compliance.

3.1.15 The method used to assess the energy efficiency of a new building is identified through Building Regulations. This in turn informs the amount of carbon released by the structure.

- Initially, an estimate of carbon emissions is calculated based on a notional building. This figure is referred to as the Target Emission Rate (TER).
- Based upon the building plans, an estimate of the carbon emissions to be created are then calculated. This is known as the Building Emission Rate (BER) or the Dwelling Emission Rate (DER). This should be less than the TER.
- Once the dwelling has been completed the actual BER can be calculated. This will indicate how energy efficient the building is relative to the building plans.

3.1.16 Carbon emissions are calculated using the following tools:

- Residential dwellings: 'Standard Assessment Procedure for Energy Rating of Buildings' (SAP);
- Non-residential buildings: Simplified Building Energy Model (SBEM).

3.1.17 SAP and SBEM calculations should be completed by an accredited energy assessor. Where SAP and SBEM outputs are not produced by an accredited energy assessor they must be verified by either an accredited energy assessor or the Waveney District Council Building Control Team.

What is the Code for Sustainable Homes?

3.1.18 The Code for Sustainable Homes (CfSH) is a national standard for the sustainable design and construction of new dwellings. The Code aims to facilitate the delivery of new homes that minimise their impact on the environment. The requirement for CfSH compliance is applied to all new residential dwellings in the District.

3.1.19 The Code measures the sustainability of a new home against several categories of sustainable design and rates the 'whole dwelling' as a complete package. It uses a 1 to 6 star (*) rating system to represent the overall sustainability performance of a new home with one star being the lowest and six stars the highest.

CfSH certified homes, Lowestoft

3.1.20 There are nine elements considered as part of a CfSH assessment which have a combined total of 107 credits. The total number of credits gained during an assessment will dictate which code level is achieved:

- to comply with CfSH Level 3, a total of at least 57 percentage points are required;
- to comply with CfSH Level 4, a total of at least 68 percentage points are required.

3.1.21 To comply with some CfSH code levels, a number of mandatory credits may be required. Elements with a mandatory requirement are denoted by an asterisk (*) below. If a dwelling does not achieve the mandatory standards and/or does not reach the minimum score for a one star rating it will receive a certificate with no stars.

- Energy and carbon emissions*
- Health and well-being*
- Surface water run-off*
- Pollution
- Materials*
- Ecology
- Water*
- Management
- Waste*

CfSH certified homes, Lowestoft

3.1.22 The CfSH assessment considers the environmental credentials of dwellings during and after construction. The completion of a pre-assessment report or interim certificate is likely to reduce the potential for unforeseen issues, costs, and delays from occurring during the construction phase. Once the dwelling has been completed a final assessment is carried out and a final certificate issued. This will state the level of the Code that has been achieved. To comply with Policy DM04 the certificate, or copy of, should be submitted to the Local Planning Authority. All Code for Sustainable Homes assessments must be completed by an accredited assessor.

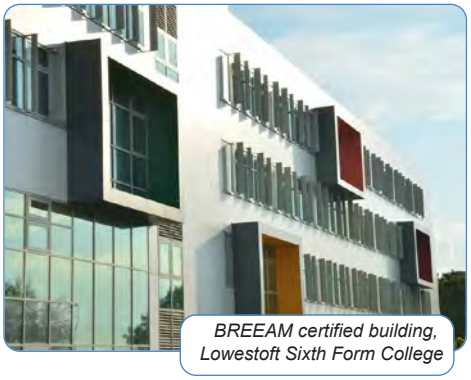
3.1.23 One of the key attributes of the CfSH standard is flexibility. Developers can choose the credits they wish to achieve which are most appropriate to their site and building design. Identification of achievable credits will be made by the assessor. It is not the responsibility of the Local Planning Authority to decide what credits should be achieved as part of the development, however, planning advice can be provided as part of pre-application discussions. Further information about what is needed to achieve CfSH compliance is set out in the Code for Sustainable Homes Technical Guidance (DCLG, 2010) (henceforth referred to as 'CfSH Technical Guidance').

<u>What is the British Research Establishment Environmental Assessment Method?</u>

3.1.24 The British Research Establishment Environmental Assessment Method (BREEAM) uses measures of performance, which are set against established benchmarks, to evaluate a building's specification, design, construction and use. BREEAM assessed buildings can achieve the following standards: pass, good, very good, excellent and outstanding.

BREEAM certified building, Ipswich

- Policy DM04 of the Development Management Policies requires all new offices and schools over 1000m2 gross floorspace to achieve BREEAM 'very good' compliance.
- Policies WEW1 and WEW2 of the Lowestoft Lake Lothing & Outer Harbour Area Action Plan (discussed in section 5) requires all new non-residential development to achieve a standard equivalent to the mandatory requirements of BREEAM 'excellent' for energy and water. This is in addition to the requirements set out in Policy DM04.



BREEAM certified building, Lowestoft Sixth Form College

3.1.25 The measures used represent a broad range of categories and criteria which are set out below. Elements that have a mandatory standard required to comply with BREEAM 'very good' standard are denoted with an asterisk (*).

- Management*
- Energy*
- Transport
- Materials*
- Water*
- Innovation
- Health and well being*
- Land use and ecology*
- Waste
- Pollution

3.1.26 There are a total of 132 credits available in the BREEAM assessment. A full list of credits available is provided in Appendix 8. The percentage score will determine which level of compliance is achieved. To comply with BREEAM 'very good' standard, a score of at least 55% must be achieved.

3.1.27 The BREEAM certification scheme works in a similar way to the CfSH scheme. An applicant is strongly encouraged to undertake an assessment at the design stage which identifies if code compliance can be achieved. Once the building is complete, a final assessment is undertaken to demonstrate if the standard has been achieved. This final standard achieved is stated in a post-completion certificate. All code assessments must be completed by an accredited assessor.

3.1.28 Some policy requirements set out in the Core Strategy, Development Management Policies and the Lowestoft Lake Lothing & Outer Harbour Area Action Plan are higher than the standards required to achieve Code for Sustainable Homes or BREEAM compliance. For example, the provision of open space, consideration of flood risk, energy and water. Where local policy requirements are higher than that set out in the CfSH or BREEAM, these can contribute towards achieving credits and code compliance.

3.1.29 The Government timetable for zero carbon development states that all new non-residential buildings are to be zero carbon from 2019. This means that the energy requirements needed to comply with BREEAM 'very good' standard will be superseded by Building Regulations from this date. The remaining requirements such as materials, ecology and management must still be met to achieve certification. Further information about how to achieve BREEAM compliance for non-residential buildings is set out in the BREEAM New Construction: Non-Domestic Buildings Technical Manual (BRE, 2011) (henceforth referred to as 'BREEAM Technical Manual').

Waveney Example: OrbisEnergy

Located at Lowestoft Ness, OrbisEnergy is a purpose built business centre aimed at the renewable energy industry. The five storey building is accredited with a BREEAM 'very good' rating. Key features of the building include:

- *raising the structure above ground to mitigate potential flooding and sea level rise;*
- *maximising passive solar gain by aligning the structure on a north-south axis and using brise-soleil screening;*
- *a biomass boiler using woodchips provides heat and a solar thermal tracker provides hot water;*
- *wind catchers enhance natural ventilation and sheep's wool insulates the structure;*
- *many of the building materials were selected based on their ability to be recycled;*
- *a bespoke building management system enables heating, lighting and ventilation to be maximised in order to reduce the building's environmental footprint.*

What do CfSH and BREEAM assessments involve?

3.1.30 The nationally recognised procedure for undertaking CfSH and BREEAM assessments usually involves several phases:

- a pre-assessment provides a brief overview of how (and if) code compliance can be achieved in principle. This is the simplest, quickest and cheapest option but it provides a limited amount of information about how the development will actually achieve code compliance;
- an interim certificate is issued upon completion of an assessment of the proposal by an accredited assessor at the design stage. This is based on drawings, specifications and commitments. Buildings that undertake an interim assessment are less likely to encounter delays and additional costs later during the build process, however, this approach is more costly than a pre-assessment;
- a final (or post-construction) assessment and certification is carried out after construction has been completed. This provides confirmation of compliance including site records and visual inspection.

What are Code Assessors?

3.1.31 Code assessments are undertaken by accredited code assessors. BRE Global Ltd and Stroma Ltd are currently licensed to be code service providers and they can provide a register of accredited assessors the applicant can choose from. Applicants are strongly encouraged to appoint an accredited assessor at the earliest possible stage in the design process. Best practice advice suggests that the assessments should be merged or closely linked to the Design and Access Statements.

Elements of the Code for Sustainable Homes (CfSH) and the British Research Establishment Environmental Assessment Method (BREEAM)

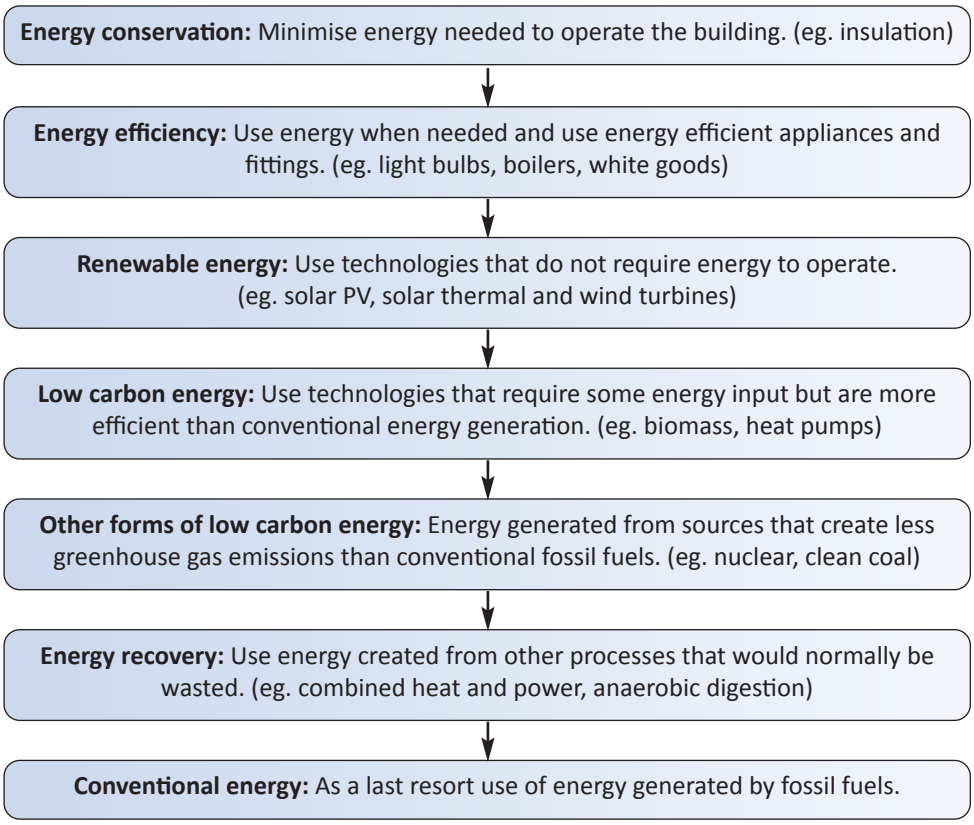
3.1.32 The following section discusses the elements of sustainable construction that should be considered when designing new buildings to comply with Policy DM04. In particular, it provides a brief overview of issues that should be considered by a developer that could contribute towards achieving Code compliance. A list of credits to achieve CfSH and BREEAM compliance are set out in Appendices 7 and 8.

3.2 How can buildings be made more energy efficient?

What is the energy hierarchy?

3.2.1 The energy hierarchy represents an approach to reduce the impact of development on the environment by considering measures to reduce energy demand, using energy efficiently and how to generate energy in a sustainable way. This approach is set out in Figure 4.

Figure 4 Energy Management Hierarchy



What are 'allowable solutions'?

3.2.2 New residential buildings are to be built to zero carbon standards from 2016 and all new non-residential buildings from 2019. Zero carbon development will take into account carbon emissions that can be controlled through Building Regulations (regulated emissions) but exclude carbon emissions generated through the building's operation (unregulated emissions). This target will be very demanding and presently there is uncertainty as to how this will be achieved. It is possible that 'allowable solutions' may be included as part of the development process to provide developers with greater flexibility to achieve zero carbon development. Possible 'allowable solutions' may include (subject to further Government consideration):

- carbon compliance on site;
- crediting section 106 obligations;
- credits for energy efficient appliance and controls;
- export low carbon and renewable heat to existing buildings;
- investment in low carbon and renewable energy schemes off site;
- off-site low carbon and renewable energy with direct physical connection to the development;
- retrofitting existing building stock.

How can the design of a building reduce energy demand?

Site layout and building design to incorporate passive energy efficiency measures should be considered before the installation of renewable and low carbon energy generating technologies. This approach is likely to be cheaper for the developer and will reduce energy costs for the building occupier over a longer period of time. Passive energy efficiency measures are simpler to install, easier to maintain and are usually less intrusive in the surrounding environment than energy generating technologies.

What is passive solar gain?

3.2.3 Passive solar gain refers to the increase of temperature associated with solar radiation receipts. It can significantly impact upon the quality of a building, how it is used and the energy needed for it to be inhabited comfortably. Key factors include the physical characteristics of the site, immediate surroundings, orientation of the building, external design, internal layout and the construction materials used.

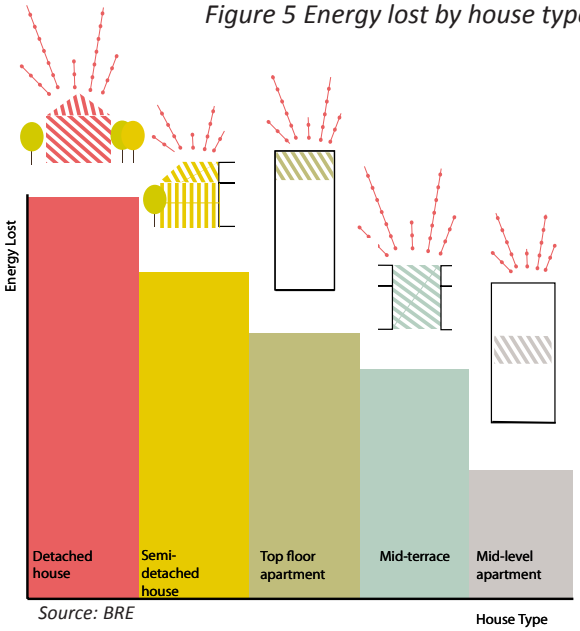
Why is a building's orientation important?

3.2.4 The orientation of a building will affect the amount of solar gain that a building receives and this in turn will affect how much energy is needed to heat and cool the building. To maximise solar gain and natural light, the primary windows should face within 30 degrees of south. The potential installation of some micro-scale renewable energy technologies will be influenced by the orientation of the building.

How does the building form affect energy use?

3.2.5 Some building designs have inherently different energy requirements than others. For example, flats and terraces are generally more energy efficient than detached or semi-detached dwellings because they have less external walls relative to living space from which heat can escape (figure 5).

Figure 5 Energy lost by house type



Source: BRE

How do building materials affect a building?

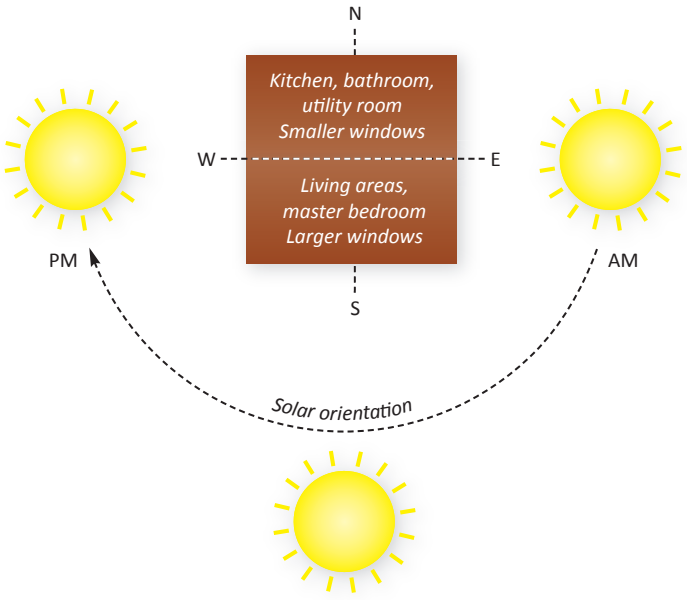
3.2.6 Construction materials can reflect, absorb and release heat differently and will influence the energy characteristics of the building. Materials used in the development should contribute to the energy efficiency of the building, be in keeping with the character of the local area and be sourced locally if possible.

How can the internal layout of a building improve living spaces and affect energy use?

3.2.7 Rooms that are used most intensively in residential dwellings such as living rooms and bedrooms are best located on the southern side of the building because they receive most sunlight. Less frequented rooms such as bathrooms and utility rooms should be located on the north side. Kitchens are most practically suited to the north side of the dwelling to reduce overheating (figure 6). The overall layout of living areas inside a dwelling will need to be balanced against the natural surveillance to other frontages.

3.2.8 The proportion of glazed surfaces can significantly affect the amount of natural light inside a building. The depth of the room is an important factor in determining the amount of natural light received. This will affect the amount of energy needed for lighting and how much heating and cooling is required to make living spaces comfortable. Roof lights and sun pipes can assist with increasing daylight in some internal spaces. CfSH and BREEAM credits are available to encourage receipts of natural light and reduce energy demand.

Figure 6 Internal building layout and movement of the sun during the day



3.2.9 Non-residential buildings should be designed to best meet their intended use. Natural light is beneficial to a good working environment but care is needed to avoid creating spaces with excessive heat gain. This could occur if solar gain is combined with the heat associated with internal lighting, high occupancy and operating equipment such as machinery and computers. A higher proportion of glazing on north facing surfaces can increase natural lighting without significantly increasing solar gain, thereby minimising excessive heat gain.

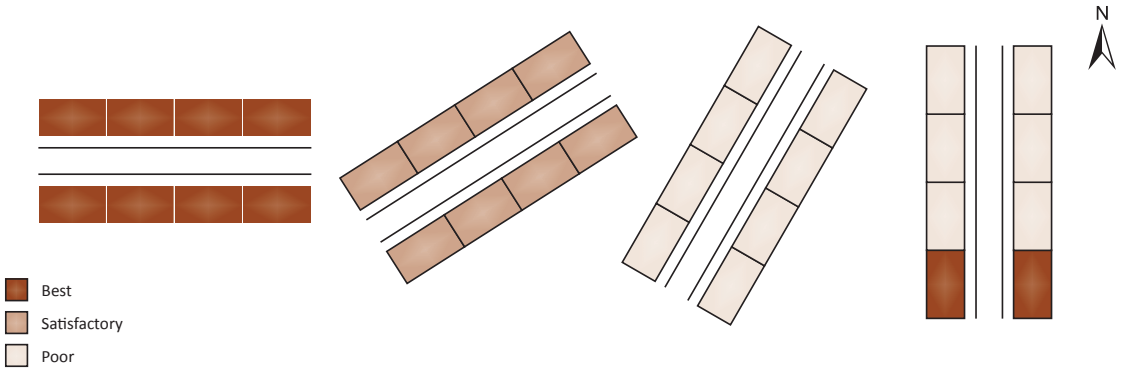
How can site layout improve energy efficiency?

3.2.10 To maximise solar receipts and reduce shading, higher buildings in a development should be located to the north of the site. Parking and garages located to the north of a building will allow solar receipts to southerly orientated living spaces to be maximised. Pitched roofs are a common feature in the local vernacular and care should be taken to ensure that roof heights do not overshadow neighbouring buildings.

What effect can street layout have?

3.2.11 Good urban design principles require buildings to face onto the street, especially in medium to high density areas. Street layout will effect how much light is received by different properties which will in turn affect passive solar gain (figure 7).

Figure 7 Street layout and solar gain

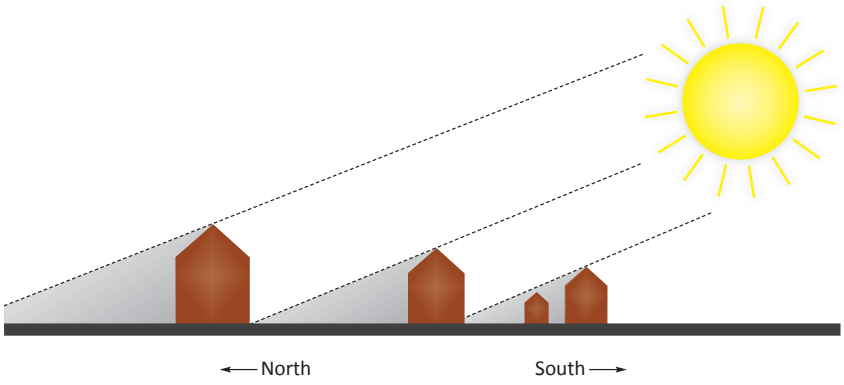


Source: Aecom

Why does urban form matter?

3.2.12 How buildings and open spaces relate to each other is important to create a quality public realm and a comfortable microclimate for people using outdoor spaces. Buildings too close to each other can result in excessive shadowing and little solar gain on external surfaces. Wide streets and well positioned buildings will create spaces that maximise receipts of natural light and heat. The design and layout of buildings should avoid the creation of wind tunnels which will reduce natural heat and may create an unpleasant external living environment (figure 8).

Figure 8 Site layout - sunlight and shadowing



How can trees improve energy use of a building?

3.2.13 Deciduous trees can increase shading and natural cooling during the summer months and allow more natural light and heat to be received during the winter months when energy demand is highest. Tree planting can also be used to shelter buildings from the wind and minimise unwanted cooling (figure 9).

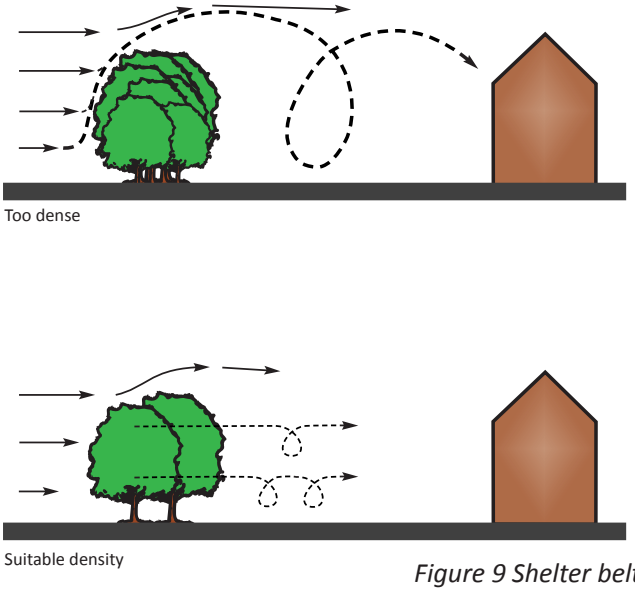


Figure 9 Shelter belt

3.2.14 Where shelter belts are used, these should be set out in a convex layout, rather than concave, to deflect the wind instead of blocking it. They should be dense enough to reduce wind speeds by allowing some wind to pass through but not block the wind in its entirety. Blocking the wind can result in an airflow accelerating over the top of the trees and descending in a turbulent fashion on the building and living area.

Does daylight improve health and well-being?

3.2.15 Good daylighting will improve the quality of life for residents/employees and reduce the need for artificial lighting. Issues to consider include how much of the sky is visible through a window and the dimensions of the interior living/working space (distance away from the window).

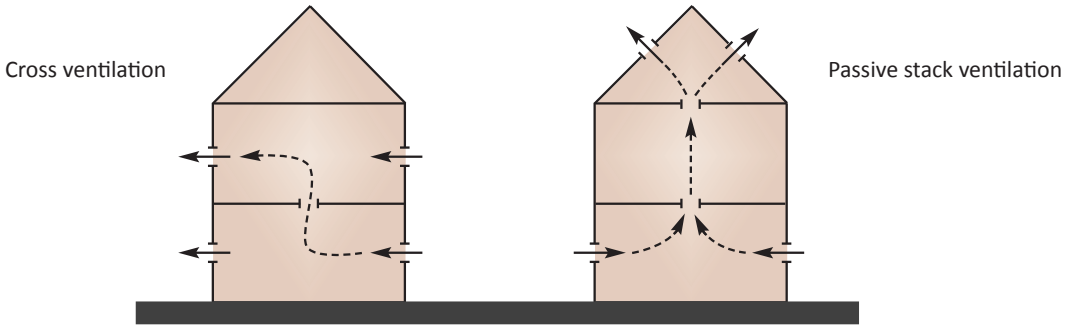
3.2.16 Glare created by natural or artificial light can be uncomfortable for people both inside or outside a building. This can be minimised if considered early in the design process through building layout (eg. low eaves height) or building design (eg. blinds, brise-soleil screening). If considered together with a lighting strategy this can reduce energy consumption.

How can air quality inside a building be improved?

3.2.17 The air quality inside a building is essential for providing healthy spaces to live and work. Two possible ways to incorporate natural ventilation into a building include:

- cross ventilation – windows located on opposite walls and roof mounted turbines or wind cowls can be used to assist with the natural ventilation and circulation of air, by drawing air through windows or top floor openings; and
- passive stack ventilation (PSV) - uses the principle of pressure differences to draw in fresh air from outside effectively replacing rising warm air which is released from the top of the building. A heat exchanger can be placed where the air escapes the building to reduce heat loss (figure 10).

Figure 10 Ventilation



Why might mechanical ventilation be needed?

3.2.18 Where insufficient natural air circulation can be achieved mechanical ventilation can be used to maintain a healthy environment. The positioning of air intakes should be carefully considered to avoid any adverse impacts on the occupants of the building. With the increasing demands of the Building Regulations air tightness will become more important when considering how to provide healthy indoor living spaces. Consequently, in the future most buildings will require some form of mechanical ventilation with heat recovery.

3.2.19 Energy efficiency is considered under the umbrellas of 'energy and CO2 emissions' and 'health and well-being' as part of the CfSH/BREEAM assessment. A list of credits are set out in Appendices 7 and 8.

Example: Ditchingham (South Norfolk)

The scheme delivered 14 affordable dwellings located in the Ditchingham conservation area. As part of the building design the following measures were incorporated into the development:

- *open space was included in the site layout on site;*
- *passive solar gain was maximised;*
- *highly insulated walls, inset windows, thermal bridge-free foundations and flooring increased energy efficiency;*
- *mechanical ventilation was incorporated into roof 'chimneys' to improve the internal living environment;*
- *roof overhangs, external blinds and the use of bay windows that do not reach the ground were used to reduce overheating in the summer.*

These dwellings have been certified to the Passivhaus standard (Passivhaus Trust, 2012).

How can the energy efficiency of existing buildings be improved?

3.2.20 The Waveney Renewable Energy and Sustainable Construction Study was completed in 2009 and assessed energy use in the District and compared urban and rural areas. The study revealed:

- average electricity and gas consumption was generally lower in urban areas where higher density living often reduces energy demands;
- electricity use was higher in areas where gas consumption was lower;
- there was a relatively high use of oil and coal in rural areas reflecting the limited gas network.

3.2.21 The different patterns of energy consumption in the District suggested that approaches to reducing energy demand should reflect the urban or rural character of the area. In urban areas electricity was the main form of energy. As most energy used in a building is for heating, heat loss improvements to existing buildings in these areas are likely to provide the greatest benefit for building occupiers. In more rural locations where there is less dependance on electricity as the main source of energy, greater emphasis on biomass fuels as an energy source (eg. biomass stove) is likely to provide the best opportunity to improve the use of energy resources. Regardless of the location, all buildings have the potential to improve their energy efficiency, however small the measures (Table 10).

How can the energy efficiency of historic buildings be improved?

3.2.22 Reducing carbon emissions generated by historic buildings can be quite challenging. To properly understand the character and functioning of these old structures it is necessary to consider their original purpose, style, height, profile materials and how these features may interact internally or with other buildings, streetscapes and landscapes. These defining characteristics may not be compatible with modern energy efficiency technologies, therefore, approaches that are less invasive need to be considered.

3.2.23 Older buildings often relied upon occupants heating the rooms that were primarily in use. Materials that could retain heat such as brick chimney breasts and solid walls were used so heat could be released over a longer period of time and using internal fittings such as doors and shutters at night. Proposed improvements to the energy efficiency of a building should reflect inherent qualities of the building fabric and how long materials take to change temperature. Some simple, less intrusive measures to improve the energy efficiency of old buildings that could be considered include:

- draught proofing;
- using removable register plates to limit air flow up the chimney;
- restoring window shutters to full operation only where making alterations to windows (eg. installing double glazed windows, secondary glazing);
- installing heavy curtains, pelmets and laying heavy carpets;
- using stoves which tend to be more efficient than open fires.

3.2.24 For replacement windows and double glazing, it is recommended that the Council's Development Management Team be contacted for advice. Careful attention will need to be given to the original window design and materials used. To prevent any unnecessary work, secondary glazing which sits behind the original windows should be considered. Additional information about improving the energy efficiency of historic buildings is available from English Heritage.

3.2.25 Historic buildings are built to have a natural amount of air circulation which is essential to retain its health. This airflow could be reduced to increase retention of heat but care needs to be taken to ensure this will not increase moisture through condensation and rising damp. Some modern insulation materials such as fibreglass and mineral wool can retain moisture making them incompatible with traditional buildings. Other materials that could be considered for loft and cavity wall insulation are sheep's wool and hemp fibre.

Table 10 Measures to improve energy efficiency of new and existing buildings

Measure to improve energy efficiency	Options to be considered
Draught proofing	• Sealant such as silicon can be applied to the frame of windows that do not open. • To reduce airflow around the door, keyhole and letterbox flaps can be attached and foam, brushes or wiper strips can be fitted around the frame. • Loft hatches can be sealed with foam strips. • Fitted caps can be placed on the chimney pot and an inflatable cushion can be used to block the chimney. • Floor boards, skirting boards and wall cracks can be filled with a flexible sealant or plaster as appropriate.
Pipes	• Seal gaps around piping.
Extractor Fans	• Disused fan outlets can be blocked up.
Insulation	• Lofts can be insulated using rolls or blown mineral wool. • Suspended floors can be insulated with mineral wool supported by netting placed between the joists. • A flat roof should be insulated from above using a layer of rigid insulation board. • Cavity walls can be insulated using mineral wool, foam, beads or granules that are blown into the cavity from outside the building. • Structures that have solid walls can have insulation applied internally or externally and will need to comply with Building Regulations. • Internal solid wall insulation can be completed by fitting rigid insulation boards to the wall or by building a stud wall filled with mineral wool fibre. This will result in a reduction of the living space inside the dwelling. • External solid wall insulation can be applied by fixing a layer of insulation material to the wall and then covering it with render or cladding. This will alter the external appearance of the dwelling, therefore, it is recommended the local planning authority be contacted. Note: The installation of solid wall insulation to the outside of a building where the façade does not front onto a highway and does not form the principle or side elevation of an original dwelling is considered to be 'permitted development' and therefore does not require planning permission.
Windows	• Double and triple glazed windows can be used to create a barrier between the heated room and the air outside.
Additional Measures	• Boiler replacement. • Insulating the hot water cylinder and piping. • Energy efficient appliances and lighting.

3.3 How can water efficiency be improved?

3.3.1 Waveney is one of the most water stressed areas in the country and is predicted to have a water deficit from 2021. Water resource issues are further discussed in the Waveney and Great Yarmouth Joint Water Cycle Strategy Scoping Study. To address local water stress issues new buildings are required to achieve higher standards than Building Regulations.

How can water consumption be reduced?

3.3.2 As of 2012, the average water consumption per person per day in England was about 150 litres. Water use in buildings is generally controlled by two factors; fixtures and the behaviour of the occupants. Water consumption in the home is generally attributed to toilets, showers, baths, taps, kitchen sinks, washing machines, dishwashers and garden use. New buildings and those being retrofitted can save water and costs by installing measures such as:

- aerated washbasin/kitchen taps and shower heads;
- tapered and low capacity baths;
- sensor and low flush toilets;
- shower timers;
- low water consuming white goods and appliances such as washing machines and dishwashers.

3.3.3 Water use during construction can be reduced by using:

- closed loop wheel wash to reuse water;
- waterless wheel washing using angled steel grids to remove debris;
- high pressure low volume power hoses;
- recirculating water where possible;
- the water used for flushing building services should be stopped as soon as possible after the flush water turns clear.

Developers are encouraged to set targets, monitor and report their water consumption from site activities.

<u>How can plumbing reduce water use?</u>

3.3.4 Choosing the best location for a boiler can reduce water consumption and heat loss. By minimising the length of hot water pipes the volume of water that has to be drawn off each time a tap or shower is used can be reduced. Positioning hot water pipes above pipes carrying cold water will reduce heat transfer. Further heat loss can be reduced by insulating the piping.

3.3.5 Limiting the flow of water through taps and appliances to a minimum rate will help balance the water pressure throughout the system, minimising the disruption to people using water elsewhere in the property.

<u>How can water be re-used and recycled to improve water efficiency?</u>

3.3.6 Rainwater harvesting involves the collection of rainwater directly from the surface(s) it falls on. Once collected and stored it can be used for non-potable purposes such as watering gardens, washing machines and toilets. Rainwater can be captured using water butts connected to a down pipe for domestic purposes. Larger systems can use water stored in underground water tanks.

3.3.7 The distribution of rainwater to appliances can be done in two ways:

- direct pumped systems distribute water that is stored in a tank or reservoir directly to the point of use when it is needed;
- gravity tank systems use water that has been collected and piped into a storage tank (usually in the loft) and then delivers it to the point of use using gravity.

3.3.8 Water that is recycled from baths, showers and wash basins for non-potable uses is known as 'greywater'. Any recycling system will need to ensure treatment on a regular basis to stop any bacteria building up. Depending on the purpose of the rainwater harvesting system, it may need to comply with British Standard BS8515:2009. Water recycling systems are better suited to new developments rather than retro-fitting existing buildings because of the excavation required for storage tanks and changes needed to the existing plumbing. These systems are generally more cost effective for new developments and those of a larger scale. Schools and employment uses can offer particular opportunities for integrating recycling and rainwater harvesting systems. Costs associated with the installation of a rainwater harvesting or recycling system will vary depending on the characteristics of the site and the proposal. Where it is demonstrated the installation of a water harvesting or recycling system may make the development unviable other measures to offset water use should be considered.

3.3.9 Recycling systems should be backed up by a mains supply or a sufficiently large reserve storage system to meet higher demands during dry spells. Storage tanks will need an overflow to allow excess water to be released which should be able to flow into a soakaway. Further guidance about reducing water use and recycling water is available from the Environment Agency and Waterwise.

3.3.10 A list of CfSH and BREEAM credits for 'water' are set out in Appendices 7 and 8.

3.4 How do building materials contribute towards sustainable construction?

3.4.1 The materials used in a development are a key part of its sustainability. Embodied energy is the cumulative energy needed to grow, manufacture and transport raw materials to a development site. Embodied energy is usually low for wood but higher for manufactured products such as concrete. Developers are encouraged to source materials locally to reduce carbon emissions associated with the transport of raw materials to the development site.

3.4.2 Some building materials can be reused or recycled such as bricks, hardcore, timbers, doors and window frames. Re-using materials is preferable over recycling because the former entails less embodied energy. Where materials are to be reused or recycled these will need to be inspected to ensure they are suitable for the development and do not need any repairs. This can reduce the amount of raw materials used in the construction of a building and help retain the character of an existing building or area. This is particularly important when working on a listed building or in a Conservation Area.

3.4.3 To comply with CfSH standards it is mandatory that at least three of the following elements; roof, external walls, internal walls, upper and ground floors and windows achieve at least a 'D' rating as set out in the

Green Guide. Credits are also available for the responsible sourcing of materials.

How can the environmental impact of building materials be reduced?

3.4.4 Material specification should be considered as part of the procurement process. Materials from a sustainable, renewable or recycled source can limit the impact of the development on the environment. Some materials such as timber from sustainable forests can be certified by an organisation such as the Forest Stewardship Council (FSC) or the Programme for the Endorsement of Forest Certification (PEFC). Using locally sourced materials will also reduce the impact on the environment by reducing transport costs. This will also support the local economy. To comply with BREEAM 'very good' standard it is mandatory that all timber used on a project is sourced in accordance with the UK Government's Timber Procurement Policy.

3.4.5 When sourcing materials, care should be taken to use products that minimise impacts on biodiversity. For example, avoid sourcing wood from forested areas at an unsustainable rate or using materials such as peat, weather worn lime-stone or other materials from vulnerable habitats.

3.4.6 Materials that have a long lifespan are of greater environmental benefit and a lasting benefit to occupiers of the building. They should exhibit characteristics of durability, low maintenance and use of waterproofing agents that are not harmful to the environment.

Can material from demolished buildings be re-used?

3.4.7 When a building has reached the end of its life, consideration should be given to its deconstruction prior to demolition so that materials in a condition to be re-used or recycled can be removed. This will reduce the amount of waste taken to landfill.

How can developers be more neighbour friendly during construction?

3.4.8 Measures to reduce the impact of construction activities are encouraged such as participation in the Considerate Constructors Scheme. This is voluntary and shows the intention of the developer to be more environmentally and socially aware of the potential impact their development may have on its neighbours. It is designed to encourage safe, considerate, clean and responsible builders and building sites. Further information on reducing the impact of construction is available from quiet.org.uk, noisenet.org, Considerate Constructors and Construction Excellence.

3.4.9 Building materials are considered under the umbrellas of ‘materials’, ‘waste’ and ‘management’ as part of the CfSH/BREEAM assessment. A list of credits are set out in Appendices 7 and 8.

3.5 How can new development reduce the potential for flooding?

3.5.1 New developments should be located and designed to minimise flood risks. Development should not increase the flood risk of other areas or divert water flows onto other sites. It is crucial that development has proper regard to all sources of flooding (surface water, groundwater, fluvial, coastal and tidal), and wherever possible reduces flood risk on and off site. The design of a Sustainable Urban Drainage System (SuDS) will depend on site characteristics including location, density of development, soil type, depth of

groundwater and the presence of contamination. Further information about SuDs is available from the Construction Industry Research and Information Association (CIRIA) and the Environment Agency.

3.5.2 Sustainable urban drainage systems can be integrated into all developments if given early consideration prior to the design and layout of a scheme being prepared. When carefully designed, SuDS can contribute towards the local green infrastructure (network of green spaces) and enhance local amenity. They provide areas to store and gradually release water into the local waterway network, planted areas to reduce the amount of pollution entering local waterways, additional areas to be used for recreational purposes and opportunities to extend or create new wildlife habitats and improve biodiversity. They also provide value as an educational resource and the framework for walkways and cycleways through sites. Where a system is designed into a development consideration should be given to how it will relate to existing green infrastructure. Additional information about the types of SuDS systems to mitigate surface water run-off is set out in Appendix 10.

3.5.3 The same principle should be applied to blue infrastructure (network of waterways). Blue infrastructure can be used to enhance local amenity and provide a focal point for a recreational asset such as a park or path, create and enhance wildlife areas and provide areas to store or slowly release water into other parts of the local waterway network.

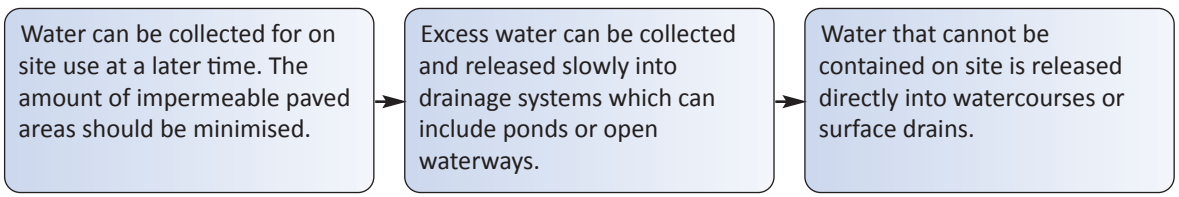
3.5.4 Suffolk County Council is the Lead Local Flood Authority and the SuDS Approval Body for Waveney, however, the date for commencement of the latter role has yet to be confirmed by DEFRA. This means that in due course Suffolk County Council will be responsible for approving, adopting and maintaining any new SuDS system that serves more than one property. The Council encourages developers to contact the Local Flood Authority early in the planning process to identify what type of SuDS system is most appropriate for their development. The Local Flood Risk Management Strategy provides further guidance.

SuDS, Carlton Colville

Surface Water Management

3.5.5 To minimise the potential for flooding, consideration should be given to how surface water accumulation can be prevented, control the run-off of excess water from the site and how the cumulative amount of run-off from a wider area can be managed. The SuDS Management Train is a hierarchical approach to manage surface water run-off from a site and reduce the rate and volume of water flow which could pose a risk to people and property (Figure 11).

Figure 11 SuDS Management Train



3.5.6 Applicants should set out how they have considered surface water management and why the approach taken is considered the most appropriate. New surface water connections to combined or foul sewage systems will not be considered acceptable. Anglian Water can provide pre-application advice to assist an applicant to identify infrastructure constraints and prepare a drainage strategy.

3.5.7 A list of CfSH and BREEAM credits for 'surface water run-off' are set out in Appendices 7 and 8.

Paving of Front Gardens

3.5.8 Space available for vehicle parking is an issue in many areas in the District. One option available to a property owner is the paving of a front garden. This is not normally encouraged by the Council. However, if carried out using permeable paving materials planning permission is not required. The paving of one or two individual gardens is unlikely to have much of an impact on the local water drainage system, however, the cumulative loss of surface area where water can drain into the ground is likely to have a detrimental impact on an area. Increasing the amount of paved surfaces can also increase the amount of pollution washed into the water network and less water infiltrating into underground aquifers.

Table 11 Planning requirements for paving of front gardens

Planning Permission for paving of garden land
Planning permission is not required for a driveway of any size if a new or existing driveway uses permeable surfacing (such as gravel, permeable concrete block, paving or porous asphalt) or if the rainwater is directed to a lawn or border to drain naturally. Planning permission is required for a driveway if traditional, impermeable materials cover an area greater than 5.2m2 and the water is not able to drain into a permeable area.

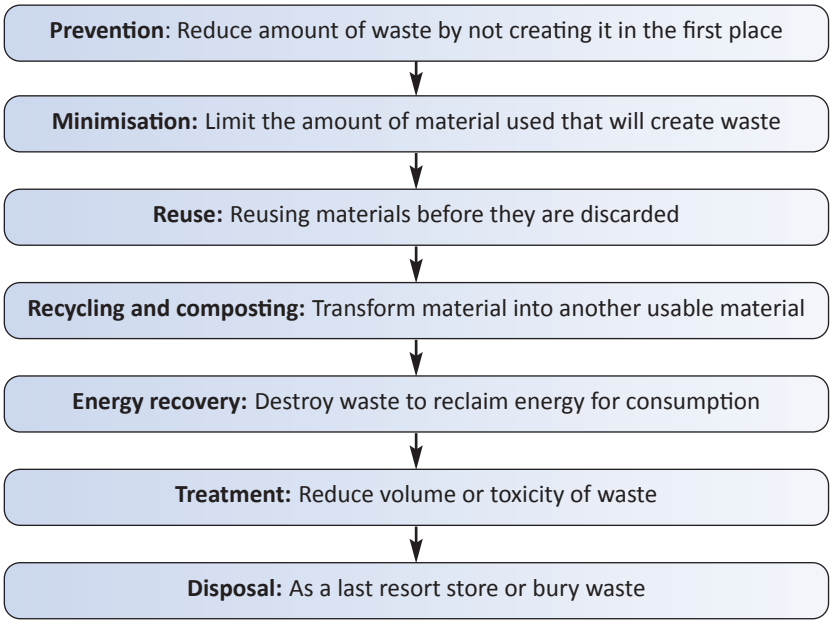
3.6 How can new development reduce construction related waste?

3.6.1 Waste creation during construction and at the end of a building's life can be minimised through good design and site waste management planning. It will also reduce the cost of the construction of a new development. Examples of designing out waste include:

- the building of rooms that are designed to use whole or regular sized sheets of plasterboard so they are not cut to leave unusable off-cuts;
- collecting and reusing half bricks from around one part of the construction site for use on another part of the site rather than disposing of them in a skip;
- careful handling of materials will ensure they are not broken by being stood on or bruised by impact damage (eg. wood or plasterboard);
- just-in-time deliveries of materials will help minimise the length of time materials will be stored where they are exposed and vulnerable to damage.

To reduce waste the approach set out in the waste management hierarchy (Figure 12) is encouraged.

Figure 12 Waste Management Hierarchy



3.6.2 Further information about designing out waste and case studies on reducing construction and demolition waste has been provided by the Town and County Planning Association and is also available on the Waste and Resource Action Programme (WRAP) website. Good practice for waste management is part of the Considerate Constructors Scheme. Site Waste Management Plans (SWMP) are required for all developments with a value over £300,000.

How can good waste storage facilities be provided?

3.6.3 The design and layout of a property or scheme are important factors to reduce the impact of waste. In larger developments consideration should be given to the location of communal facilities for recycling. At a smaller scale, individual building plots need to have enough space for refuse and recycling storage (internal and external) and consideration should be given to the provision of composting facilities if possible. In addition to the credits available as part of a CfSH and BREEAM assessment, the following considerations should be taken into account:

- be easily accessible;
- not have the potential to create a nuisance to local people; and
- not have an adverse impact on local amenity.

3.6.4 'On the go' recycling facilities should be provided in public spaces to enable the public to recycle their waste while outside of the home or workplace. These are litter bins that provide the opportunity for a person to separate different types of materials for waste recycling (eg. paper, cans, non-recyclables). These should be conveniently located for the public to use.

On the go recycling facilities, Bungay

3.6.5 In Waveney, standard provision of waste containers includes a 140 litre bin for one and two bedroom flats and a 240 litre bin for a dwelling or flat with three bedrooms or more. To achieve CfSH compliance it is mandatory that the larger of the two standards set out below is provided:

- 100 litres for a single bedroom dwelling and a further 70 litres for each additional bedroom (British Standard 5906, British Standards Institute (2005)); or
- 140 litre bin for a two bedroom flat or 240 litre bin for a house or flat with three or more bedrooms (Waveney District Council standard). Further information is available from Waveney District Council's Waste Team.

3.6.6 Construction related waste is considered under the umbrellas of 'waste' and 'management' as part of the CfSH/BREEAM assessment. A list of credits are set out in Appendices 7 and 8.

What about waste scheme applications?

3.6.7 Suffolk County Council is the Waste Authority for Waveney. The Waste Core Strategy sets out the approach to be taken until 2026. Planning proposals associated with waste disposal or waste for energy should be directed to Suffolk County Council.

3.7 How can pollution and noise disturbance be reduced?

3.7.1 Housing located in the vicinity of busy transport routes and non-residential land uses may result in occupants of new developments being subjected to air and noise pollution. Pollutants can have an impact on personal health, an individual's quality of life and local amenity. For residential properties improved sound insulation will reduce the likelihood of noise complaints from neighbours. For non-residential buildings the requirements vary depending on the nature of the development but consideration should be given to noise created by the impact of rain on the roof and insulating particular rooms within a building sensitive to noise.

3.7.2 Measures to reduce noise disturbance include internal wall insulation such as wool or foam, external wall insulation such as membranes or panels, acoustic glazing, acoustic barrier fencing and landscaping belts. Consideration should be given to the positioning of openings designed for natural ventilation.

3.7.3 The construction phase of a development can be the source of noise and air pollution that could impact on local amenity. Developers are encouraged to consider how their development may affect local residents during construction. If there is uncertainty about new development and the implications of noise or air pollution it is recommended that the Council's Environmental Protection Team be contacted.

3.7.4 Pollution and noise disturbance is considered under the umbrellas of 'pollution', 'health and well-being' and 'management' as part of the CfSH/BREEAM assessment. A list of credits are set out in Appendices 7 and 8.

3.8 How can new buildings improve health and well-being?

What are ‘Lifetime Homes’?

3.8.1 Lifetime Homes are properties designed to be flexible and adaptable to provide better homes to live in and support a higher quality of life for their occupants. The concept of a Lifetime Home is that a person can adapt their home over time to meet their needs as they change during their lifetime. The approach takes into account 16 design criteria that cover aspects of the development both inside and outside of the building. It is possible to minimise the cost of achieving this Standard, where they exceed Building Regulations, if they are considered at an early stage of the design process.

3.8.2 Research suggests that the Standard reduces the need to move from the home into supported housing. This enables people to stay in their homes and the area they are familiar with for longer, improving their quality of life. At the same time, the design does not reduce functionality for younger and/or able-bodied occupants. As such, the Lifetime Homes standard is likely to be marketable as an attractive proposition for home buyers seeking to downsize or remain in a dwelling where they can retain their independence for longer.

3.8.3 Information on local need can be found from various sources, such as the Housing Local Improvement Network. The Council seeks to maximise the number of dwellings built to the Standard in line with Policy DM17. There are four credits available that contribute towards CfSH compliance.

What are 'lifetime neighbourhoods' and ‘sustainable urban neighbourhoods’?

3.8.4 For further background, but not part of the CfSH/BREEAM assessment criteria, lifetime neighbourhoods and sustainable urban neighbourhoods are approaches to deliver new development schemes that are accessible and inclusive, aesthetically pleasing and safe. Communities should have access to services, facilities and open space that can support a well integrated neighbourhood. Together these attributes should reinforce a strong sense of place, local identity and encourage community empowerment. This approach is reflected in the Sustainable Urban Neighbourhood and Kirkley Waterfront Development Brief for central Lowestoft.

What type of private outdoor space should be provided?

3.8.5 As a general rule, the provision of private open space should be accessible to all occupants of the property(s). This provision could be in the form of a private or communal garden, balcony, roof terrace or patio depending on the nature of the development. Over and above CfSH credits, Waveney District Council also requires the provision of public open space associated with new development. For developments of 20 or more dwellings this should be on-site (see Policy DM25: ‘Existing and Proposed Open Space’ and guidance set out in Waveney’s Open Space SPD).

How can access and transport be improved?

3.8.6 A transport assessment is useful to understand local transport patterns and can inform the design of a scheme. Considerations should include pedestrian and disabled access, cycle storage and changing facilities, public transport links serving the site, priority car parking spaces for car-sharers and providing suitable drop-off and waiting areas.

How much cycle storage space should be provided?

3.8.7 To support the shift towards travel patterns less reliant on the car, new developments are encouraged to include the following cycle storage standards:

- studios or 1 bedroom dwellings - storage for 1 cycle for every two dwellings;
- 2 and 3 bedroom dwellings - storage for 1 cycle per dwelling;
- 4 bedrooms and above - storage for 2 cycles per dwelling;
- for offices and schools – 1 cycle space per 10 building occupants (staff). Showers should also be provided, 1 unit for every 10 cycle parking spaces (staff).

3.8.8 The minimum floor storage area required to store cycles is:

- 1 cycle: 2m long × 0.75m wide;
- 2 cycles: 2m long × 1.5m wide;
- 4 cycles: 2m long × 2.5m wide.

3.8.9 For new residential properties, cycles may be stored in any of the following:

- garage or shed;
- external or internal communal cycle store;
- proprietary storage or hanging system.

3.8.10 For offices and schools, cycle parking areas should have overhead covering to protect them from the weather.

3.8.11 Storage areas and locks should conform to the Secured by Design standards. Where communal facilities are provided the room should have no windows, however, the design of any facility should reflect other attributes of the proposal.

3.8.12 Within a storage facility, a stand which allows both wheel and frame to be locked, made of strong material such as galvanised steel bar construction (minimum steel thickness of 3mm) should be provided. The stand should have a minimum foundation depth of 300mm with a welded anchor T-bar set in concrete. These specifications are less demanding than the local standards recommended by Suffolk County Council. Therefore, to ensure that any new development complies with planning policy, the Suffolk Advisory Parking Standards should be consulted.

3.8.13 Where storage is to be provided as part of a garden shed the space set out above should be in addition to at least 1m2 set aside for garden tools. The shed should be set on a concrete foundation and fastened securely.

3.8.14 Where cycle storage is provided in a garage, adequate space should be provided to store the bicycle(s) and car(s) at the same time. To achieve CfSH credits in this manner, the dimensions set out above should be added to the typical minimum garage sizes. These include:

- 2.4m × 4.9m for a single garage;
- 5m × 5.2m for a double garage.

3.8.15 Cycle storage facilities should enable the user to have direct access to a Public Right of Way. To gain CfSH credits access through a dwelling is not considered acceptable. Where a communal cycle storage facility is provided this should be located within 100m of the main entrance to the block of flats.

How is cycle provision considered for non-residential development?

3.8.15 In non-residential developments, cycle provision such as storage and changing facilities shoul dbe considered as part of a travel plan. Cycle lanes that enable direct and safe access to cycle storage facilities on-site should also be considered. The same principles relating to security and storage space as set out for residential developments should be considered.

3.8.16 Health and well-being is considered under the umbrellas of 'health and well-being' and 'energy and CO2 emissions' as part of the CfSH/BREEAM assessment. A list of credits are set out in Appendices 7 and 8.

3.9 How can new development create and enhance local ecology and biodiversity?

3.9.1 With proper consideration, existing habitats provide opportunities to enhance a development if they are integrated into a scheme early in the design process. Mature trees on a site will support wildlife and can be a stepping stone towards colonising other landscape features within or near the area of the development. Water bodies should be retained on site wherever possible as these can be integrated with SuDS schemes or other measures to provide habitat improvements or habitat corridors.

3.9.2 The NPPF and the Local Development Framework prioritise new development on previously developed land (brownfield) rather than land that has not been developed (greenfield). Brownfield and greenfield sites have different characteristics and are likely to support different forms of biodiversity. Local Biodiversity Audits (WDC, 2007) for potential development sites across Waveney found both greenfield and brownfield sites to be rich in biodiversity, which could be susceptible to damage if poorly designed development is brought forward.

Biodiversity, Oulton Marshes

3.9.3 The ecological quality and value of a site should be assessed by a qualified ecologist. This assessment can provide important information about flora, fauna and habitats that may need to be protected, how the development proposal could be improved/amended to enhance biodiversity and provide greater detail about appropriate measures to mitigate any impacts.

How can a development enhance the site and wider area?

3.9.4 Proposals should seek to enhance biodiversity assets on site and consider how a new scheme could be integrated into or complement existing green infrastructure and biodiversity where possible. This is most effective when considered early in the design stage of a project. Possible ways to enhance the biodiversity of a site include:

- planting of native species;

- adoption of good horticultural practice (eg. low use of pesticides);
- installing bird and bat boxes at appropriate locations on the site (further information is available from the Royal Society for the Protection of Birds and the Bat Conservation Trust);
- avoiding clearance works at particular times of year;
- designing and integrating SuDS and green roofs into the development;
- preparing a biodiversity management plan.

3.9.5 Consideration should be given to plant species that are indigenous to the local area and can tolerate environmental conditions characteristic to Waveney. Located on the coast and in an area where rainfall is relatively low, plants should be salt and wind tolerant and be able to cope with limited water availability. Coastal areas also exhibit smaller annual temperature variations throughout the year than areas in the west of the District. The Council's Landscape Officer can provide information about the appropriate planting of tree species and landscaping.

Is design important when considering how to enhance biodiversity?

3.9.6 Biodiversity can be enhanced on site by including green and brown roofs as part of the design. Living roofs, as these are often referred to, can be retrofitted onto existing flat or gentle sloped roofs. These can be heavy and it is important the structure is designed (or surveyed if it is an existing building) to ensure it is capable of supporting the additional weight. Sloped roofs are characteristic of the local area and proposed living roofs should be considered in the context of local character.

What is a green roof?

3.9.7 A green roof is the growing of plants on the rooftop of a building. To recreate a natural environment, plants grow on a surface that is made up of a series of layered materials used to retain water and support plant life. These materials can retain enough water to support plant life whilst allowing excess water to drain. Water is gradually released after periods of rainfall to reduce the pressure on drainage systems and provide insulation for the building on which it lies. Green roofs enhance biodiversity by creating habitats, often in urban areas where wildlife habitat is limited.

Green roof, Lowestoft

3.9.8 There are three main types of green roofs:

- Extensive: Usually supports mosses, succulents, herbs and grasses. Intended to be self sustaining with no need for irrigation and minimal maintenance. This type of green roof is shallow and is the least demanding on the building structure. It offers limited biodiversity potential and has the lowest amount of water retention.

- Simple intensive: Has a greater depth than extensive roofs and encourage greater biodiversity. They recreate a more natural ground based habitat.

- Intensive: Recreates a good ground based habitat. They are made up of a thick base layer with good water retention that can support a good variety of plants, scrubs and trees. These can be designed to replicate gardens and can be used by people. They add significant weight to the building structure and require regular maintenance.

What is a brown roof?

3.9.9 Brown roofs are building surfaces covered with a thin layer of gravel and rubble. Potentially sourced on site, they provide habitat for spiders and insects and a feeding site for birds.

3.9.10 Installation of green (and brown) roofs has multiple benefits such as managing water run-off, enhancing biodiversity, enhancing visual amenity, improving insulation and reducing the heat island effect. The installation of such roofs on community buildings or schools also provides educational opportunities. Further information is available from a number of sources including the Environment Agency and Buglife.

What are green walls and façades?

3.9.11 Green façades or walls are created by vegetation growing on a base that is fastened to the building. Plants that can comfortably grow on this base include grasses, lichens, climbing and flowering plants. Green walls provide thermal insulation and are designed to 'breathe' to prevent excess moisture build up. A structural survey should be undertaken to ensure the building can support the additional weight.

3.9.12 A list of CfSH and BREEAM credits for 'ecology' are set out in Appendices 7 and 8.

3.10 How can the design of a building improve security?

3.10.1 To encourage developments where people feel safe and secure, applicants are encouraged to consult with an Architectural Liaison Officer or Crime Prevention Design Officer from the local police force at the design stage and their recommendations incorporated into the design of the building. In Suffolk, the Architectural Liaison Officer can be contacted through the Suffolk Constabulary. Further information about incorporating security and crime prevention principles into new developments is available as part of the Secured By Design scheme.

3.10.2 Safety and security is considered under the umbrella of 'management' as part of the CfSH/BREEAM assessment. A list of credits are set out in Appendices 7 and 8.

3.11 How can new homeowners be informed about operating their property efficiently?

What is a home user guide?

3.11.1 A home user guide contains details about the everyday use of the home in a format that is easy for the occupier to understand. It should provide information about the design attributes of the building, technologies and appliances that have been installed, how these are to be operated and how they should be maintained. The guide should also provide information about how the home could be efficiently operated and where additional information could be sought if the homeowner wished to make some improvements to their home at a later date. Information about the wider attributes of the development site and the local area is also encouraged.

3.11.2 The home user guide is considered under the umbrella of 'management' as part of the CfSH/BREEAM assessment. A list of credits are set out in Appendices 7 and 8.

3.12 What additional information sources are available locally?

3.12.1 The sharing of 'best practice' and examples can be useful. In Suffolk, information about climate change and ways to mitigate and adapt to climate change are set out in the Suffolk Climate Change Action Plan 2 (Suffolk Climate Change Partnership, 2012). The Suffolk Green Building Network has been created to share best practice, knowledge and examples of sustainable buildings that have been completed in Suffolk.

Suffolk Green Buildings Network (SGBN)

Incorporating green design into your development can benefit you and the environment. But how can this be achieved and are there any examples of real buildings in Suffolk that prove this?

The Suffolk Green Buildings Network showcases an extensive range of Suffolk buildings (domestic and non-domestic) that demonstrate green design can lead to lower fuel and water bills as well as having other environmental benefits, not least creating more inspiring buildings to live and work in. The Network's website (www.greensuffolk.org/sgbn) explains the different technologies, indicates who undertook this work and provides signposts to further information and assistance to support green aspirations to become a reality.

Carbon Emissions and Carbon Compliance

4

4. Carbon Emissions and Carbon Compliance

Policy DM05 – Carbon Emissions and Carbon Compliance

Decentralised, low carbon and renewable energy is a priority for Waveney District Council. Planning applications for new development in Waveney will need to demonstrate how they contribute to delivery of the renewable energy targets set out in Policy DM03.

All new buildings will be encouraged to achieve a 15% reduction in residual CO2 emissions after Building Regulations Part L compliance has been demonstrated having regard to feasibility and viability. This can be achieved through "carbon compliance", i.e. a combination of energy efficiency measures, incorporation of on-site low carbon and renewable technologies and directly connected heat (heat source not necessarily onsite).

Planning applications will be required to submit documentation clearly showing the Target Emission Rate (TER) and Dwelling Emission Rate (DER) / Building Emission Rate (BER) along with details of how the CO2 emission requirements will be achieved.

How will Policy DM05 be applied?

4.1 Policy DM05 is designed to make developers more aware of opportunities to improve energy efficiency and encourage the consideration of energy efficiency measures early in the design process. As part of a planning application applicants will be required to submit:

- an 'energy statement' that sets out energy efficiency measures considered as part of a proposal and how this will be delivered;
- an estimate of the Building Emission Rate (BER) and carbon emissions for each dwelling and state if, and by how much, the development is expected to exceed Building Regulations for energy efficiency. Applicants are not required to submit calculated Target Emission Rates (TER) or Building Emission Rates (BER) with a planning application. (TER and BER are discussed in greater detail on page 45 of this document.)

4.2 To comply with Building Regulations applicants are required to calculate the BER once the building has been completed. This figure also informs the final Code assessment. Submission of the BER (and the reduction of carbon emissions above Building Regulations) to the Local Planning Authority contribute towards demonstrating compliance with Policy DM05.

4.3 Applicants submitting proposals for development that include low carbon and renewable energy technologies with a total generating capacity of 50kW or greater (this is significantly larger than a domestic-scale installation) should demonstrate how they contribute towards the District's renewable energy targets. This requirement will not be applied to proposals less than 50kW.

What development does the policy apply to?

4.4 With the exception of householder developments that involve the addition of living space onto an existing building or an extension to existing commercial premises, all proposals are to submit an 'energy statement' as part of a planning application.

What should be included as part of an 'energy statement'?

4.5 The 'energy statement' should be clearly titled and may be submitted on its own as part of a planning application or included within the Design and Access Statement. Information should include:

- an estimate of how energy efficient the new buildings will be. This figure should be set out as a percentage (%) relative to Part L of the Building Regulations (i.e. how much more energy efficient will the building be than Building Regulation requirements);
- estimated carbon emissions to be reduced beyond Building Regulations compliance set out as a percentage (%) (applicant should use carbon emission figures set out in Part L of the Building Regulations);
- passive energy efficiency and design measures designed into the proposal to improve warmth in winter and cooling in summer (eg. site layout, building form, orientation, overshadowing, use of glazing, external shading, natural ventilation, building materials etc.);
- if any renewable energy technologies are to be installed state the type of technology, how much energy they are expected to produce and show where these are to be located on a plan of the building/site;
- reductions in energy consumption and carbon emissions resulting from supplying energy efficiently. For larger schemes an applicant should demonstrate that the use of combined heat and power, a community/district heating scheme or centralised heating system has been explored. This may not be applicable to all proposals and in such cases the applicant should set out why such a scheme is not considered appropriate;
- if the buildings on site have been designed to be connected to a larger energy network in the future.

How can energy efficiency be encouraged?

4.6 To encourage new development to be more energy efficient developers should consider:

- passive design measures that could be incorporated into the proposal;
- incorporating renewable energy technologies into the building or scheme design;

Solar panels, Worlingham

- how energy efficiency and renewable energy technologies will reduce energy use and energy bills making the property more attractive to prospective home buyers;

- energy savings that can be made across the site;
- using technologies and design features to enhance the site and its surroundings;
- the financial incentives available that could bring long-term income for the developer or house owner (that will outweigh the capital cost of the technology);
- additional carbon emission savings will contribute towards additional CfSH/BREEAM credits which will provide the developer with greater flexibility to comply with Policy DM04.

What if the planning application is for an extension of time of an existing consent?

4.7 Applications for an extension of time or renewal of an existing planning permission will be treated as a new application and therefore need to comply with the requirements set out in Policy DM05.

Lowestoft Lake Lothing & Outer Harbour Area Action Plan

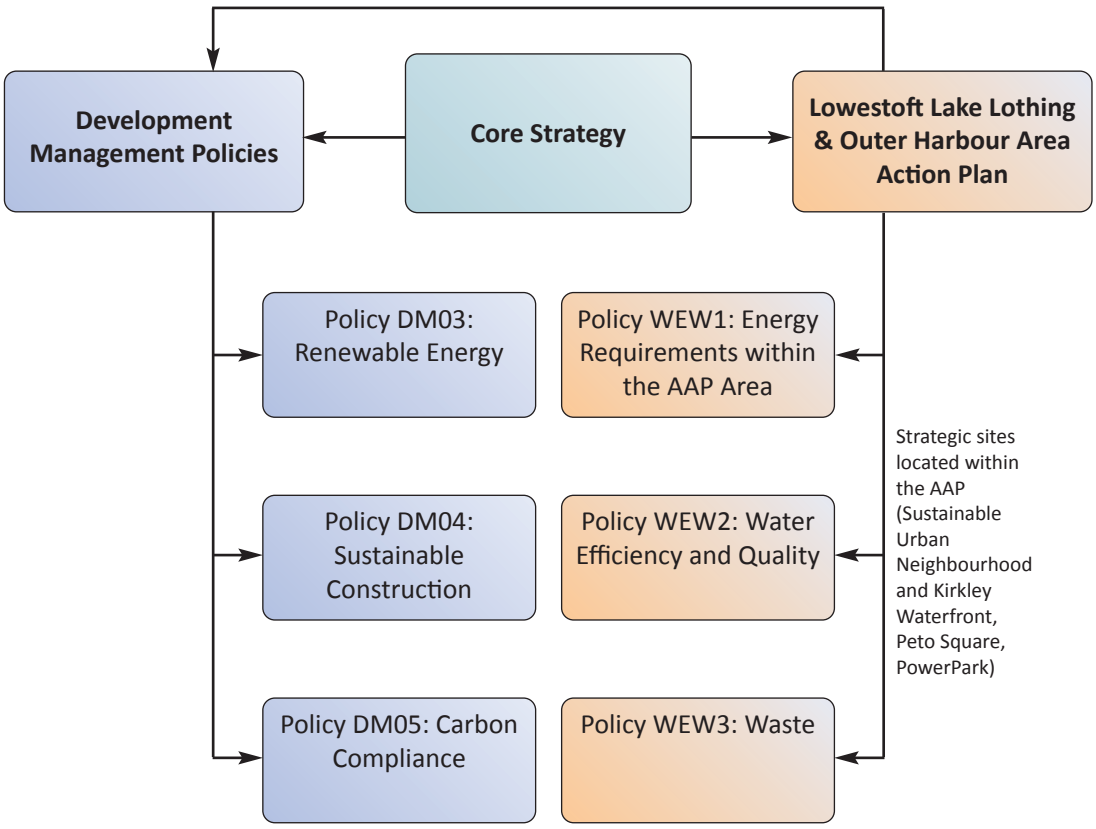
5

5. Lowestoft Lake Lothing & Outer Harbour Area Action Plan

5.1 Central Lowestoft will accommodate the most significant amount of development in the District during the plan period. The Lowestoft Lake Lothing and Outer Harbour Area Action Plan sets out the quantum of housing and employment to be delivered and the supporting infrastructure required.

5.2 Policy CS02 of the Core Strategy and Policies DM03, DM04 and DM05 of the Development Management Policies apply to development across the District, including the area lying within the boundaries of the Lake Lothing & Outer Harbour Area Action Plan. However, Policies WEW1, WEW2 and WEW3 set out in the Area Action Plan apply to development in the Kirkley Waterfront and Sustainable Urban Neighbourhood, Peto Square and PowerPark and have higher energy, water and waste management requirements. This reflects the opportunities presented by development of larger scale and higher density. Other sites in the AAP are expected to comply with the requirements set out in Policies DM04 and DM05.

Figure 13 Waveney planning policy structure



What are the energy and water requirements in the AAP area?

5.3 Policy WEW1: 'Energy Requirements Within the AAP' states:

Policy WEW1 - Energy Requirements within the AAP (Part)

"…developers must deliver the equivalent of the energy requirements of Code for Sustainable Homes Level 5 (in residential buildings) and BREEAM excellent (in other buildings) unless these technologies can be proven technically unsuitable or commercially unviable."

5.4 Policy WEW2: 'Water Efficiency and Water Quality' states:

Policy WEW2 - Water Efficiency and Water Quality (Part)

"Developers must explore the potential to implement water recycling measures on a building or site-wide scale to significantly reduce mains water demand as part of all new development within the AAP."

"…developers must deliver infrastructure to reduce mains water consumption to the equivalent requirement of Code for Sustainable Homes Level 5 (in residential buildings) and BREEAM excellent (in other buildings) unless these strategies can be proven technically unsuitable or commercially unviable."

How should Policies WEW1 and WEW2 be applied?

For residential buildings

5.5 Only the energy and water requirements are higher than those set out in Policy DM04. **Applicants submitting proposals for residential development in the main strategic sites in the AAP are required to submit a final CfSH certificate to the Local Planning Authority prior to the final dwelling on site being occupied. Applicants are strongly encouraged to undertake a CfSH pre-assessment report or interim certificate prior to the commencement of building works to demonstrate if the higher energy and water standards can be achieved.** This will also show if Code compliance is viable and feasible. To achieve the energy standards equivalent to CfSH level 5, there are mandatory requirements for both carbon (ENE1) and building fabric (ENE2). Only the requirements for ENE1 should be applied.'

5.6 To comply with Policies WEW1 and WEW2:

- a final CfSH code certificate should be submitted to the Local Planning Authority that demonstrates compliance with the CfSH level applicable at the time of planning consent;
- a final CfSH certificate should demonstrate that the energy and water requirements equivalent to Code level 5 have been achieved.

5.7 The planning condition will be discharged when a CfSH pre-assessment has been undertaken and demonstrates that:

- additional energy and water requirements above the appropriate Code level are not achievable then the requirements as set out for Policy DM04 are to be applied;

- Code compliance to the standard set out in policy cannot be achieved then the applicant should demonstrate that the highest level identified has been achieved;
- achieving Code compliance is not viable or feasible;

5.8 These energy and water standards are challenging. The applicant should state if the approach taken to achieve energy and water efficiency is based on individual buildings or on a larger community scale. This should be included as part of the 'energy statement' discussed in section 4. Developers are encouraged to maximise the benefits of scale that may be available to reduce costs and make the standards more achievable.

For non-residential buildings

5.9 To comply with Policies WEW1 and WEW2:

- all new non-residential proposals should submit a BREEAM assessment consistent with guidance set out in section 3;
- for schools and offices over 1000m2 gross floor space:
    - the assessment should show if compliance to BREEAM 'very good' standard has been achieved;
    - the assessment should show if the mandatory requirements for BREEAM 'excellent' standard for energy and water have been achieved;
- for all other non-residential buildings that are not schools and offices over 1000m2 gross floor space:
    - the assessment should show if the mandatory requirements of BREEAM 'excellent standard' for energy and water have been achieved;
    - for all other elements in the BREEAM assessment, these need only comply with Building Regulations.

5.10 The planning condition will be discharged when BREEAM pre-assessment has been undertaken and demonstrates that:

- additional energy and water requirements above the appropriate Code level are not achievable then the requirements as set out for Policy DM04 are to be applied;
- Code compliance to the standard set out in policy cannot be achieved then the applicant should demonstrate that the highest level identified has been achieved;
- achieving Code compliance is not viable or feasible.

5.11 For developments of multiple buildings, developers are encouraged to maximise the benefits of scale that may be available which may reduce costs and make the standards more achievable. Where proposals are for mixed use or there are other types of land uses in the immediate vicinity the developer is encouraged to explore opportunities with other developers to maximise energy generation or recycling and water harvesting where appropriate. This could be mutually beneficial to developers with proposals in the area.

What if the proposal is not feasible or viable?

5.10 If the applicant considers the energy and water requirements not to be feasible or viable this should be clearly demonstrated to the Local Planning Authority.

- A pre-assessment or interim certificate will demonstrate if achieving the required code level is feasible.
- If considered not to be viable this should be demonstrated through open book accounting. The

approach to be followed is set out in the Affordable Housing Supplementary Planning Document. A summary diagram of the planning process is set out on page 82.

What are the waste requirements in the AAP area?

5.12 Policy WEW3: 'Waste' states:

Policy WEW3 - Waste (Part)

"Development…should use sustainable construction materials that are recycled or locally sourced, unless demonstrated otherwise. Development within the AAP area should seek to minimise the production of waste and reuse demolition materials from within the AAP area where practicable. Recycling facilities must be provided during construction and as an integral part of new developments in the AAP area."

"All applications for development in the AAP area should be accompanied by a Demolition and Site Waste Management Plan demonstrating how waste will be managed and recycled during the demolition and construction phases."

How should Policy WEW3 be applied?

5.13 To comply with Policy WEW3 a Site Waste Management Plan (SWMP) should be submitted by the applicant prior to the commencement of building works. The SWMP should state how best practice will be implemented. Guidance is available from BRE, DEFRA and WRAP (Waste and Resource Action Programme). For residential developments, the preparation of an SWMP can contribute towards credits and achieving code compliance. For non-residential developments, the preparation of a SWMP is mandatory to achieve BREEAM 'very good' compliance'.

What is required when submitting a planning application? 6

6. What is Required When Submitting a Planning Application?

Why are pre-application discussions between the applicant and the Local Planning Authority encouraged?

6.1 Pre-application discussions between an applicant and the Local Planning Authority are encouraged. They provide an opportunity for developers and the Council to work together to create high quality developments that provide benefits for new residents, businesses and the community. Discussions early in the planning process can identify issues related to any proposal and ensure that it will comply with planning policies, optimise the potential of a site and save time and costs during the project. Pre-application discussions provide the opportunity for developers to clarify what is required to comply with policies DM03, DM04 and DM05 as well as other policies in the Local Development Plan.

6.2 Engagement with stakeholders such as the local community and an independent design body can also provide useful feedback on the proposal. If a planning application is submitted that does not comply with policy and no justification has been provided then additional costs and delays may be incurred.

Table 12 Summary of the information that should be provided to the Local Planning Authority as part of a planning application (there may be additional requirements depending on the nature of the development).

Residential developments

Outline Planning Application
• Energy statement
  o State if a community-scale energy network will be provided or why such a facility has been considered inappropriate.
 	
Detailed Planning Application
• State if a CfSH pre-assessment or interim certificate has been completed.
• Details of how CfSH compliance will be achieved (eg. credits to be obtained).
• Energy statement
  o Energy efficiency measures to be considered as part of a proposal and how these should be delivered;
  o Estimate of the Building Emission Rate (BER) and carbon emissions for each dwelling and state if, and by how much, the development is expected to exceed Building Regulations for energy efficiency;
  o State if the building can be connected to an external energy network in the future.
• Where an energy generating technology is proposed:
  o set out how much energy will be generated;
  o if the site is located near a designated landscape or historic feature set out how this may potentially impact on these;
  o identify potential impacts on local amenity;
  o if the total energy generating capacity is 50kW or greater state how this will contribute towards the District renewable energy targets.
 	
(Planning conditions will require the submission of a final CfSH certificate to the Local Planning Authority prior to the occupation of the final dwelling on site).
 	
Site Waste Management Plans (SWMP) should be submitted with all development schemes with a value over £300,000.

Householder developments

- Policies DM04 and DM05 will not be applied.

Schools and offices with a gross floor area of 1000m² or greater

Outline Planning Application

- Energy statement
    - o State if a community-scale energy network will be provided or why such a facility has been considered inappropriate.

Detailed Planning Application

- State if a BREEAM pre-assessment or interim certificate has been completed.
- Details of how CfSH compliance should be achieved (eg. credits to be obtained).
- Energy statement
    - o Energy efficiency measures to be considered as part of a proposal and how this should be delivered;
    - o Estimate of the Building Emission Rate (BER) and carbon emissions for each dwelling and state if, and by how much, the development is expected to exceed Building Regulations for energy efficiency;
    - o State if the building can be designed to connect into an external energy network in the future.
- Where an energy generating technology is proposed:
    - o set out how much energy will be generated;
    - o if the site is located near a designated landscape or historic feature set out how this may potentially impact on these;
    - o identify potential impacts on local amenity;
    - o if the total energy generating capacity is 50kW or greater state how this will contribute towards the District renewable energy targets.

(Planning conditions will require the submission of a final BREEAM certificate to the Local Planning Authority prior to the occupation of the final dwelling on site).

Site Waste Management Plans (SWMP) should be submitted with all development schemes with a value over £300,000.

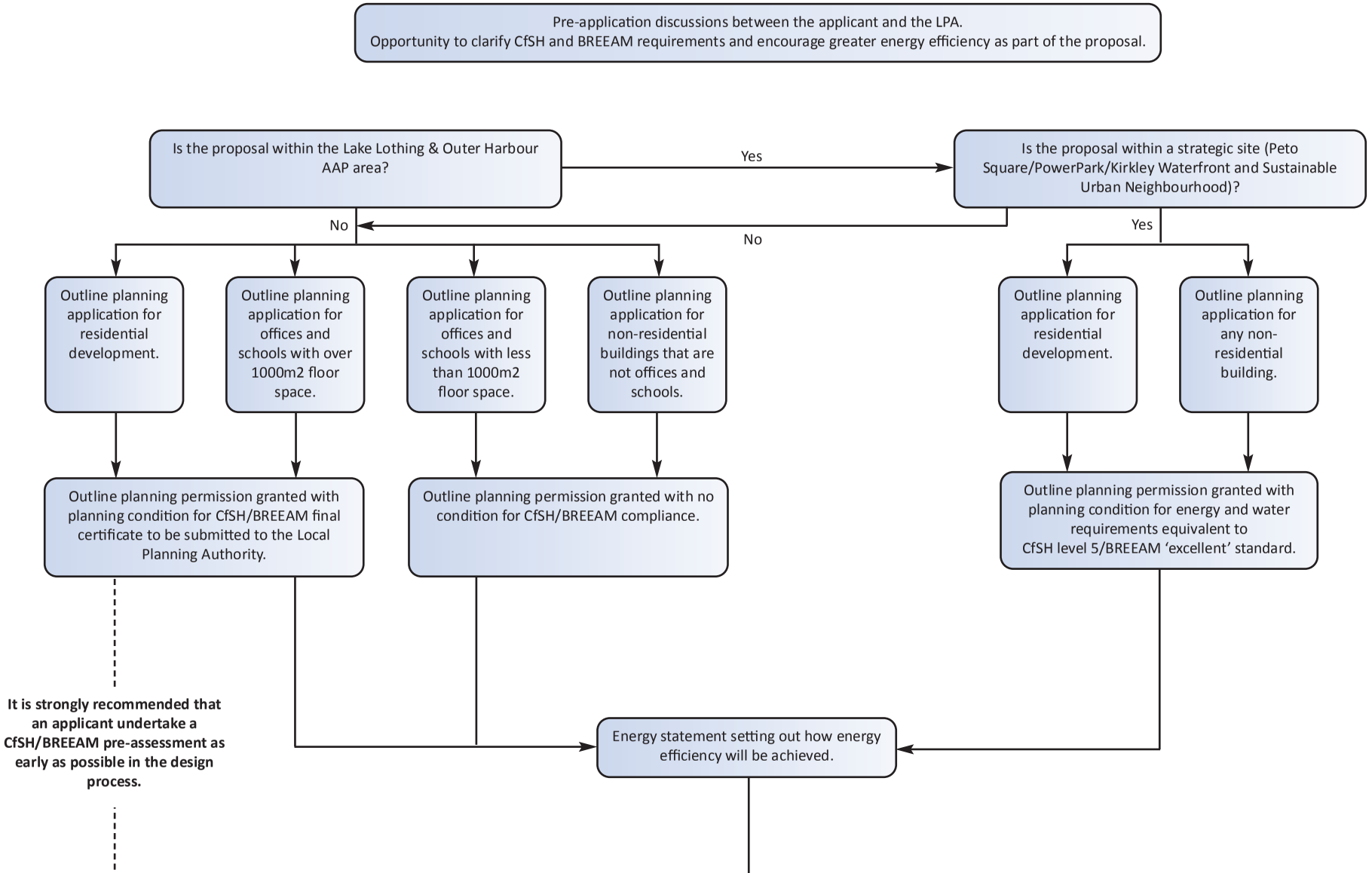
Non-residential buildings that are not schools or offices with a gross floor space of 1000m² or greater

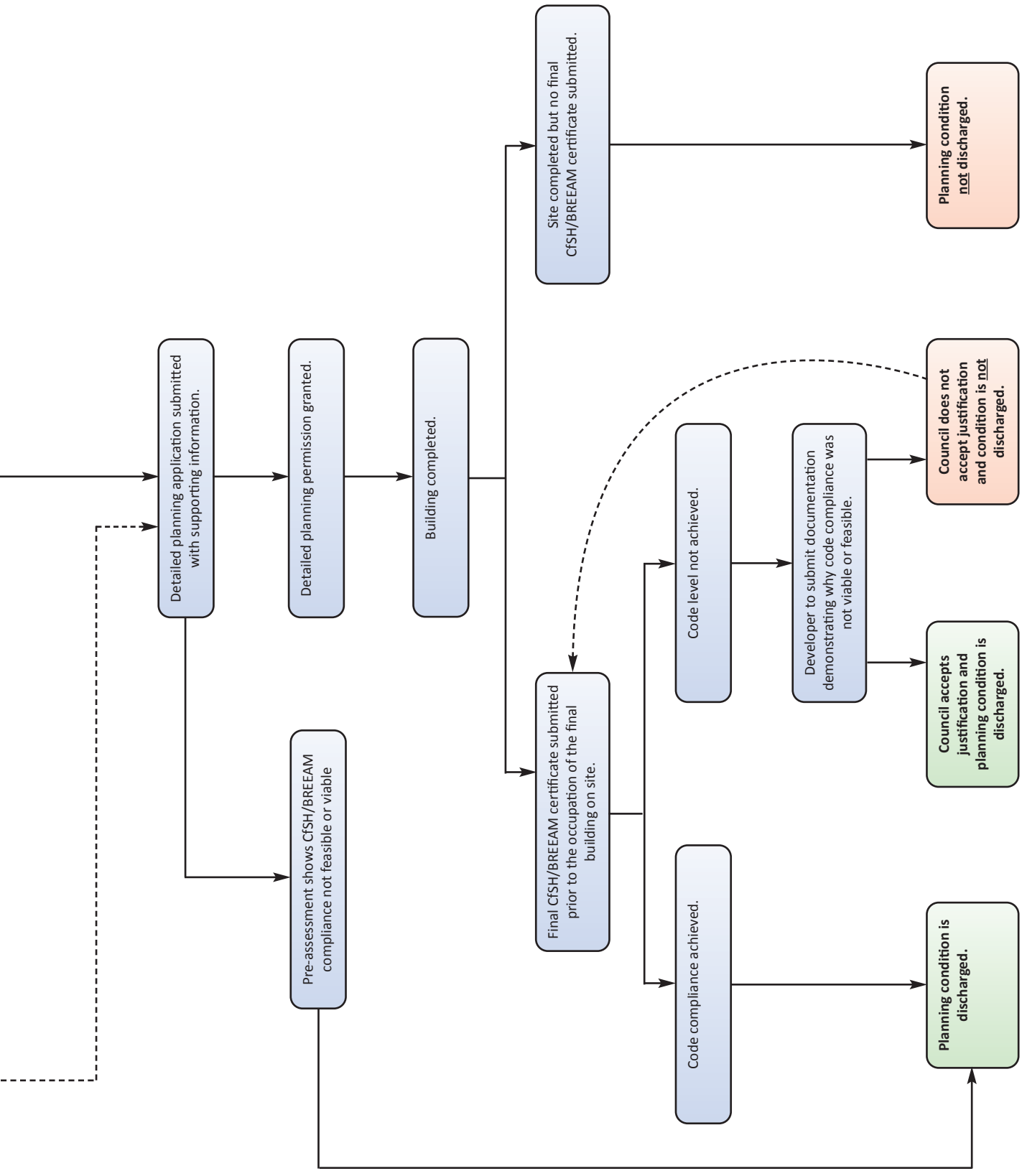
- Energy statement
    - o Energy efficiency measures to be considered as part of a proposal and how this should be delivered;
    - o Estimate of the Building Emission Rate (BER) and carbon emissions for each dwelling and state if, and by how much, the development is expected to exceed Building Regulations for energy efficiency;
    - o State if the building can be designed to connect into an external energy network in the future.
- Where an energy generating technology is proposed:
    - o set out how much energy will be generated;
    - o if the site is located near a designated landscape or historic feature set out how this may potentially impact on these;
    - o identify potential impacts on local amenity;
    - o if the total energy generating capacity is 50kW or greater state how this will contribute towards the District renewable energy targets.

Site Waste Management Plans (SWMP) should be submitted with all development schemes with a value over £300,000.

Table continued on page 84

Planning Applications Process for New Buildings to Comply with the District Councils CfSH and BREEAM Policy Standards




Detailed planning application submitted with supporting information.
Detailed planning permission granted.
Building completed.
Site completed but no final CfSH/BREEAM certificate submitted.
Planning condition not discharged.
Pre-assessment shows CfSH/BREEAM compliance not feasible or viable
Final CfSH/BREEAM certificate submitted prior to the occupation of the final building on site.
Code level not achieved.
Developer to submit documentation demonstrating why code compliance was not viable or feasible.
Council does not accept justification and condition is not discharged.
Council accepts justification and planning condition is discharged.
Code compliance achieved.
Planning condition is discharged.

Low carbon and renewable energy schemes

- Identify how the scheme may impact on the landscape or areas with a designation, historic features, urban areas or nearby residences. If there are likely to be impacts state why the site is considered the most appropriate for the scheme and include any mitigation measures.
- State if there are likely to be cumulative impacts when other developments or planning permissions have been considered.
- Set out the wider environmental, economic, social and community benefits of the scheme.
- Generating capacity of the installation (kW or MW).
- State the amount of energy to be generated annually (MWh per year).
- If the energy generated will be used on site, locally or delivered to the national energy network.
- How the proposal contributes towards the District's renewable energy targets.
- How the technology will be decommissioned, removed and the site restored.

Extension of time for an existing planning permission

6.3 Applications for an extension of time or renewal of an existing planning permission will be treated as a new application and therefore need to comply with the requirements set out in Policies DM03, DM04 and DM05.

Non-compliance, feasibility and viability

6.4 Where compliance with the full requirements of policies DM04 and DM05 cannot be achieved it will be the developer's responsibility to demonstrate why this is not feasible or viable. The same method of assessment should be undertaken as that set out in section 6, 'Financial Viability', of Waveney's Affordable Housing SPD, including the use of open book accounting.

6.5 Without evidence being put forward to the Local Planning Authority, the determination of the planning application may be delayed and put the proposal at risk of being deemed non-compliant with planning policy. If the requirements are not met once the building has been completed planning conditions will not be discharged.

Local Development Orders

6.6 There are five Local Development Orders (LDO) in place in the District:

- Ellough (Beccles);
- Mobbs Way (Oulton);
- PowerPark (Lowestoft);
- Riverside Road (Lowestoft);
- South Lowestoft Industrial Estate (Lowestoft).

6.7 The LDOs set out guidelines which, if the proposal meets the specifications, will ease the planning requirements. Where proposals do not meet the LDO requirements they are required to comply with the Development Management Policies and the guidance set out in this Supplementary Planning Document.

Monitoring 7

7. Monitoring

7.1 Monitoring of renewable energy and sustainable construction technologies and their installation will take place as part of the Annual Monitoring Report (AMR). A number of indicators will be used to assess the effectiveness of the policies and SPD including:

- installed electricity generating capacity using renewable energy;
- number of dwellings that comply with Code for Sustainable Homes standards;
- number of new non-residential buildings that achieve BREEAM compliance;
- number of new dwellings that comply with Building For Life standards;
- number of planning permissions with SuDS (in the AAP area).

7.2 The SPD will be kept under review in light of all material information and guidance. A review may be triggered by national or local changes in policy or if the guidance provided in this document is not having the intended results.

Appendices

Appendices

Page Number

Appendix 1: Planning Legislation

- Planning and Compulsory Purchase Act (as amended) (2004) sets out the structure of the local planning framework for England and requires planning policy to contribute towards the mitigation and adaptation of climate change.
- Climate Change Act (2008) sets out legally binding targets to reduce greenhouse gas emissions by 34% by 2030 and 80% by 2050.
- Energy Act (2008) enables initiatives such as the Feed-In Tariff and the Renewable Heat Incentive to be introduced to encourage increased renewable energy generation.
- Planning Act (2008) requires Local Planning Authorities to include polices that are designed to secure development that will mitigate climate change and identifies National Policy Statements as the vehicles to determine planning applications for large-scale infrastructure projects (over 50 megawatts).
- Planning and Energy Act (2008) provides provision for Local Planning Authorities to include local targets for low carbon and renewable energy and higher local construction standards above Building Regulations in their policies.
- Flood and Water Management Act (2010) sets out provisions about water management including flooding and water scarcity.
- Energy Act (2011) aims to improve the energy efficiency of existing buildings through initiatives such as the Green Deal.
- The Localism Act (2011) devolves greater planning powers to councils and neighbourhoods with the intention of giving local communities more control over planning decisions. One of the mechanisms put in place to enable this is giving communities the opportunity to prepare neighbourhood plans. A neighbourhood plan can set out policies to guide local development in the future provided it is general conformity with the local plan strategic policies. They can be used to set out additional development in the local community but they cannot be used to prevent development that has already been allocated in the adopted plan.
- The Town and Country Planning (General Permitted Development) (England) Order 1995, Part 40 (as amended 2011), Installation of Domestic Micro-generation Equipment.
- The Town and Country Planning (General Permitted Development) (England) Order 1995, Part 43 (as amended 2012), Installation of Domestic Micro-generation Equipment.

This legislation has been supported by several strategies which include:

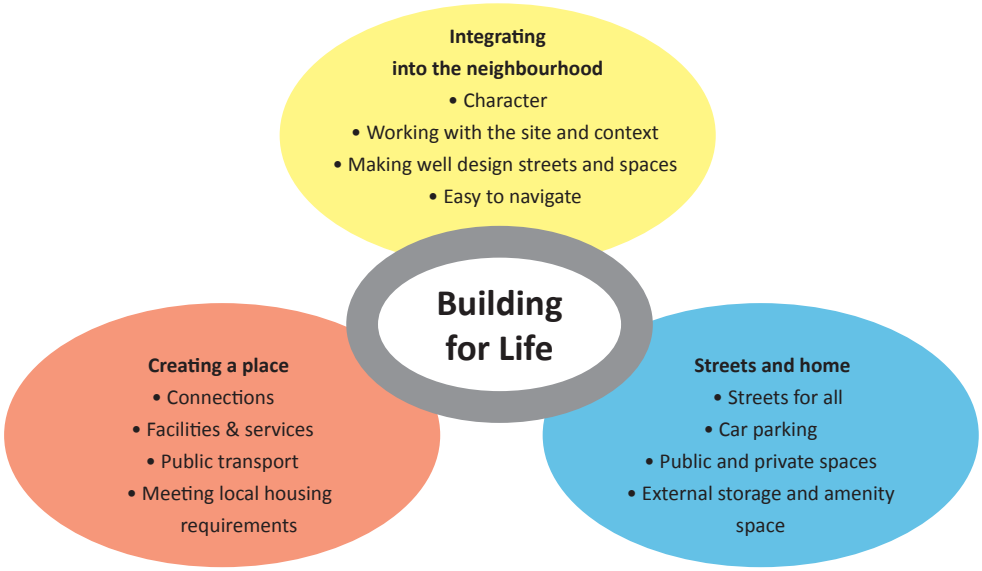
- The UK Low Carbon Transition Plan (2009) sets out how the UK can achieve 34% reduction of carbon emissions by 2020.
- The UK Renewable Energy Strategy (2009) anticipates the UK will supply 15% of all energy from renewable sources by 2020.
- Micro-Generation Strategy (2011) encourages greater engagement with members of the community to deliver local heat and power.
- UK Renewable Energy Roadmap (2011) sets out the Government's approach to delivering renewable energy and updates provide information about what has been achieved nationally and steps forward in the future.

Appendix 2: Building for Life Standard

What is the 'Building For Life' standard?

A2.1 'Building for Life' is a national standard to encourage well designed homes and neighbourhoods. The overarching aim of the standard is to create quality housing and improve the quality of life for residents by considering the elements set out in Figure A2.

Figure A2 Elements of the Building for Life Scheme



Appendix 3: Carbon Emissions, Energy Generation and Energy Consumption

Carbon emissions

A3.1 Fossil fuels such as coal have a higher carbon output than others fuels (eg. nuclear or solar PV). The link between fuel, energy and carbon enables carbon dioxide emissions to be used as a mechanism to calculate how energy efficient something may be. The Government is using carbon dioxide emissions as a way of monitoring the impact of existing and new development on the environment.

Power and energy

A3.2 Power is the rate at which energy is generated or consumed and is measured in watts (W), kilowatts (kW) and megawatts (MW) depending on the scale. Using a local example, the large wind turbine located at Ness Point has an installed capacity of 2.75MW. This means that under ideal conditions the turbine could theoretically have a maximum power output of 2.75MW.

A3.3 Energy is a measure of how much fuel is contained or used by something over a period of time and is commonly measured in kilowatthours (kWh). To understand how much energy the 2.75MW wind turbine at Ness Point can provide in practical terms, it can be related to domestic energy use in Waveney. To convert its energy output to kWh, the energy rating (2.75MW) is multiplied by the number of hours in the year (8760) which equals 24,090,000kWh. In 2006, the average electricity consumption for each residential dwelling in Waveney was 4,549kWh. The capacity factor, or amount of energy actually generated is about 30% of the installed capacity. This means the Ness Point turbine could supply over 1500 homes with electricity. This same methodology (using the appropriate level of efficiency) can be applied to other energy generating technologies.

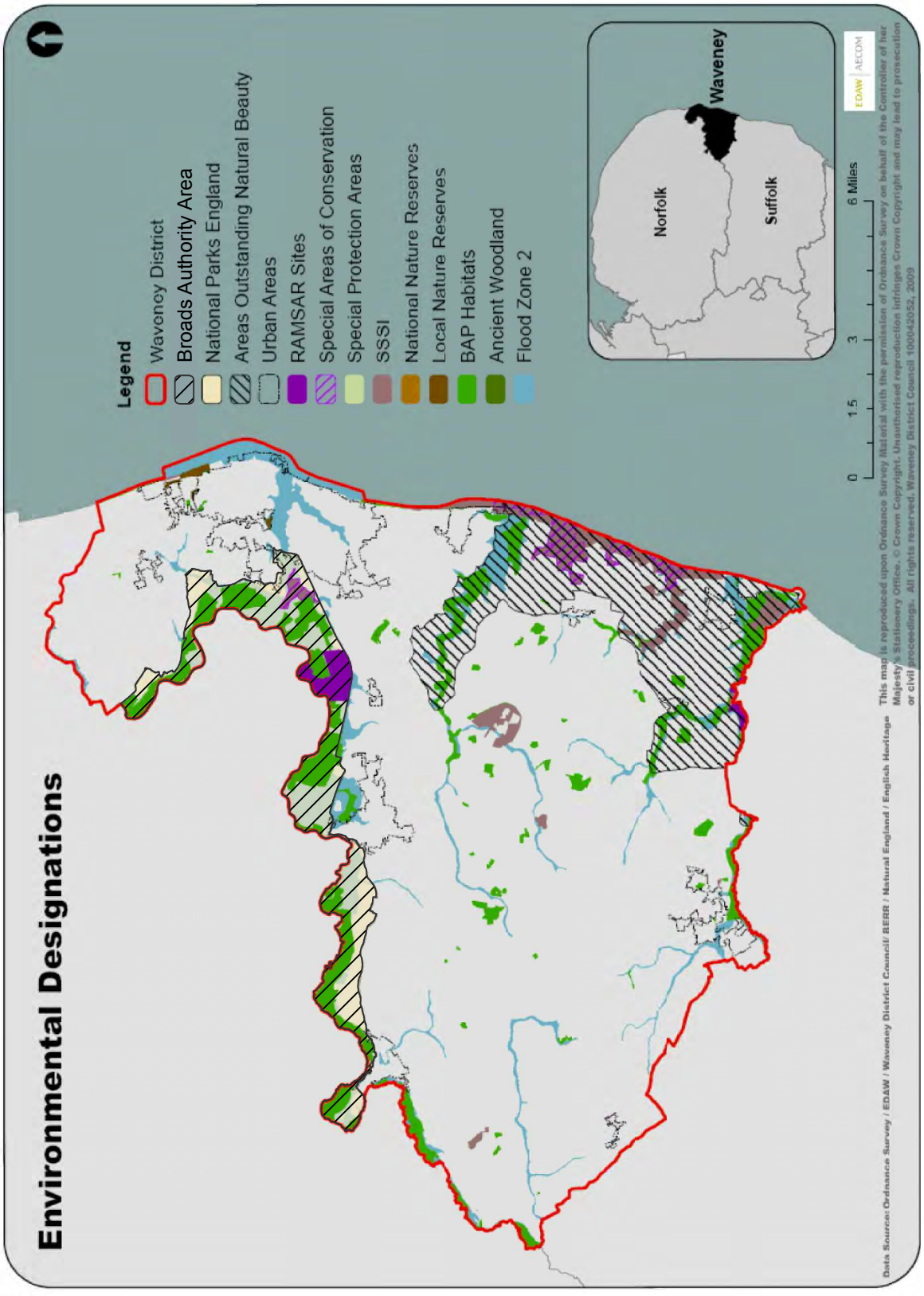
Energy use in Waveney

A3.4 The patterns of energy use in the District identified in the Waveney Renewable Energy and Sustainable Construction Study include:

- average home releases 1.9 tonnes of carbon from electricity and 3.17 tonnes of carbon from gas and this is expected to increase as the demand for more energy intensive appliances increases;
- electricity consumption in Waveney is higher in areas where gas consumption is low and vice versa; energy use per household is lower in Lowestoft than the outlying areas;
- electricity demand is lower in built up areas where building densities are higher;
- other common fuel types used in the District include coal and oil which reflect the rural nature of the District and the current limitations of the gas network.

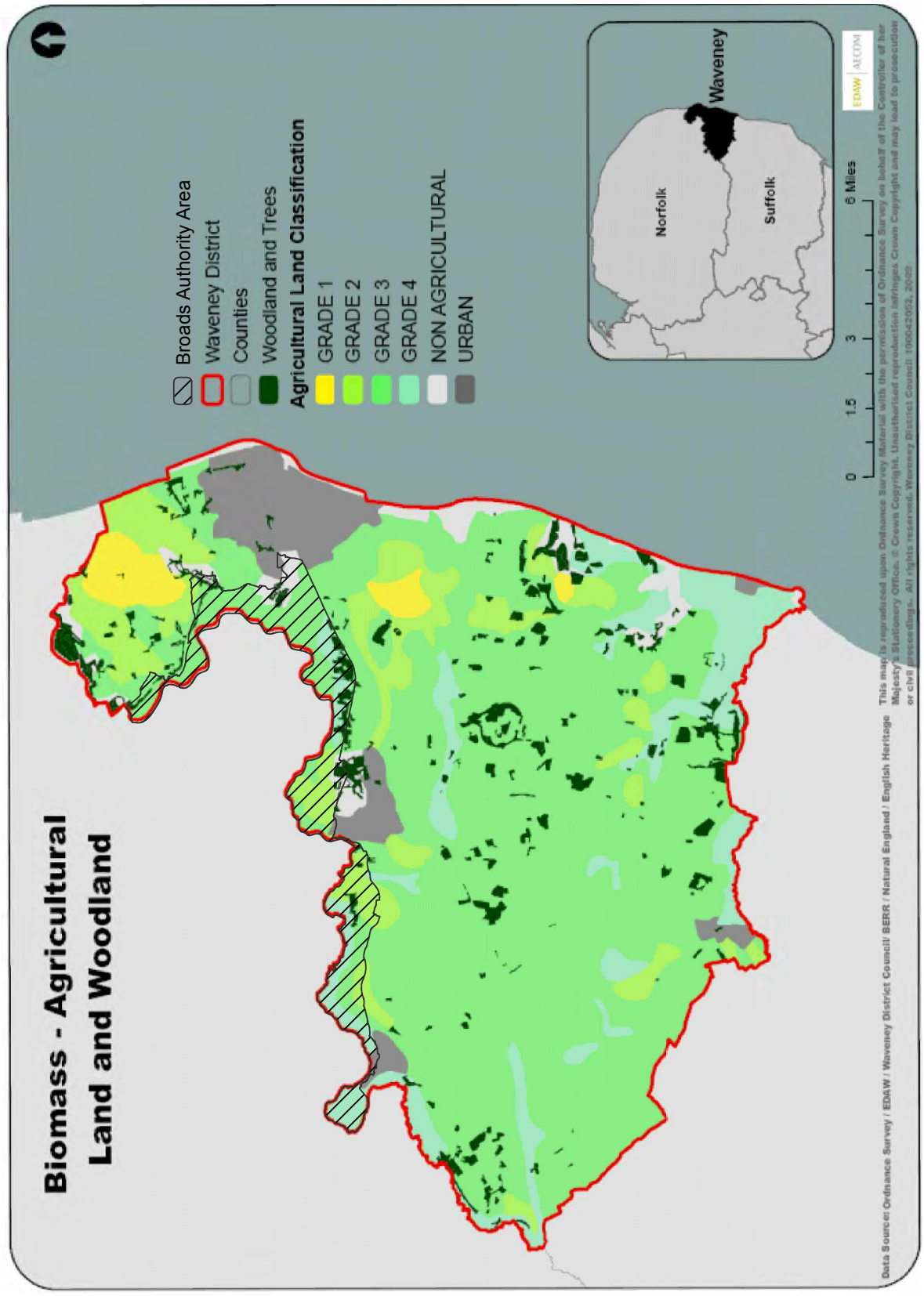
A3.5 If the electricity grid expands, new development connects into the existing network or large numbers of households switch from oil and gas to electricity this will contribute towards a significant increase of carbon emissions.

Appendix 4: Environmental Designations in Waveney



Source: Waveney Renewable Energy and Sustainable Construction Study (2009)

Appendix 5: Biomass and Agricultural Land in Waveney



Source: Waveney Renewable Energy and Sustainable Construction Study (2009)

Appendix 6: Energy Service Companies (ESCos)

A6.1 The capital cost of a district heating system is high but the energy savings make it cost effective over a period of time. In Waveney, where there is a significant amount of fuel poverty, this is a concern if the initial costs are passed onto the energy user. Traditionally, developers have completed their developments and moved onto another scheme with no further involvement. If a developer wished to recoup their costs with a district heating network, or some other technology that had been installed, then the electricity and finance generated needs to be managed as part of a business model.

A6.2 One such business model is that of an energy service company (ESCo). The key feature of an ESCo is that it has a separate budget and business plan from the host organisation (Waveney District Council) and it provides a focussed management of the energy projects. There are four different types of ESCos:

- Private ESCos are profit making organisations that are usually interested in developments with more than 200 units. Using private finances, a private company invests in the energy generating technology and in return take receipts from the sale of energy.
- Public ESCos are public sector investment into energy generating technology and in return gains receipts from sale of energy. They have access to funding sources not available to the private sector.
- Hybrid public/private ESCos can be established to share the risk between public and private sectors. Potential to be structured as joint ventures or special purpose vehicles where the different parties have a stakeholding or membership.
- Stakeholder Owned Special Purpose Vehicles are similar to the hybrid approach except that ownership is shared amongst a variety of stakeholders who may include customers receiving the energy, strategic bodies such as the local authority, communities or cooperatives.

A6.3 ESCos provide an opportunity to create a network of energy generating technologies at different scales. The above discusses how an ESCo relates to district heating but they can also be used to deliver domestic and commercial schemes such as solar arrays or turbines. In this context an ESCo could work alongside communities to assist in the implementation of local schemes that have direct benefits for the community.

A6.4 Multi Utility Service Companies (MUSCos) are similar to ESCos in that they can provide the same energy related services as an ESCo but they can also provide other services such as telecommunications and water.

Appendix 7: CfSH Assessment Credits

The table below sets out the credits available to gain CfSH certification (as listed in the CfSH Technical Guidance). A developer can achieve compliance through whichever composition of credits the wish, however, some elements have mandatory requirements that must be achieved. Where these apply they have been set out in the main document.

Code level requirements:

- to comply with CfSH Level 3, a total of at least 57 percentage points are required;
- to comply with CfSH Level 4, a total of at least 68 percentage points are required.

Summary of categories and issues that make up the CfSH assessment			
Categories	**Issue**	**Credits available**	**Total credits and weighting**
Energy and Carbon Emissions	• Dwelling emissions rate (mandatory requirements apply to Code level 4 and above) • Fabric energy efficiency (mandatory requirements apply to Code levels 5 and 6) • Energy display devices • Drying space • Energy labelled white goods • External lighting • Low and zero carbon technologies • Cycle storage • Home office **Total Credits**	10 9 2 1 2 2 2 2 1 **31**	Weighting = 36.40% Weighted value of each credit is worth 1.17
Water	• Indoor water use (mandatory requirements apply to all levels of the Code) • External water use **Total Credits**	5 1 **6**	Weighting = 9.00% Weighted value of each credit is worth 1.50
Materials	• Environmental impact of materials (mandatory requirements apply to all levels of the Code) • Responsible sourcing of materials – basic building elements • Responsible sourcing of materials – finishing elements **Total Credits**	15 6 3 **24**	Weighting = 7.20% Weighted value of each credit is worth 0.30
Surface Water Run-Off	• Management of surface water run-off from developments (mandatory requirements apply to all levels of the Code) • Flood risk **Total Credits**	2 2 **4**	Weighting = 2.20% Weighted value of each credit is worth 0.55
Waste	• Storage of non-recyclable household waste (mandatory requirements apply to all levels of the Code) • Construction site waste management • Composting **Total Credits**	4 3 1 **8**	Weighting = 6.40% Weighted value of each credit is worth 0.80

Summary of Categories and Issues that make up the CfSH Assessment			
Categories	**Issue**	**Credits Available**	**Total Credits and Weighting**
Pollution	• Global warming potential (GWP) of insulants • NOx emissions **Total Credits**	1 3 **4**	Weighting = 2.80% Weighted value of each credit is worth 0.70
Health and Well-Being	• Daylighting • Sound insulating • Private space • Lifetime homes (mandatory requirements apply to Code level 6) **Total Credits**	3 4 1 4 **12**	Weighting = 14% Weighted value of each credit is worth 1.17
Management	• Home user guide • Considerate Constructors scheme • Security **Total Credits**	3 2 2 **9**	Weighting =10% Weighted value of each credit is worth 1.11
Ecology	• Ecological value of the site • Ecological enhancement • Protection of ecological features • Change in ecological value of the site • Building footprint **Total Credits**	1 1 1 4 2 **9**	Weighting = 12.00% Weighted value of each credit is worth 1.33
	Total Credits available	**107**	Total weighting = 100%

Appendix 8: BREEAM Assessment Credits

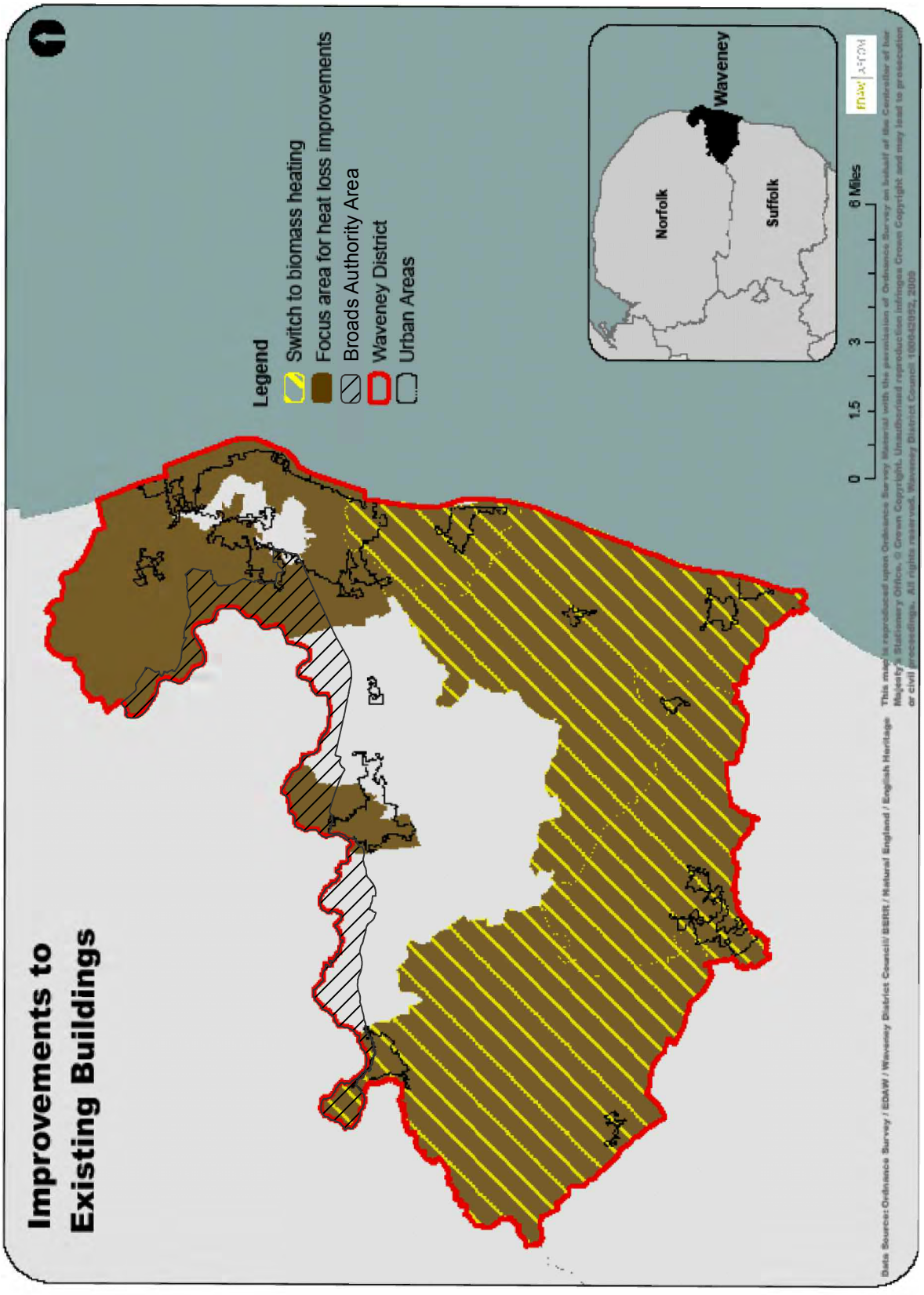
The table below sets out the credits available to gain BREEAM certification (as listed in the BREEAM Technical Guidance). A developer can achieve compliance through whichever composition of credits the wish, however, some elements have mandatory requirements that must be achieved. Where these apply they have been set out in the main document.

To comply with BREEAM 'very good' standard, a score of at least 55% must be achieved.

Summary of categories and issues that make up the BREEAM assessment			
Categories	**Issue**	**Credits available**	**Total credits and weighting**
Management	• Sustainable procurement (mandatory requirements apply to 'very good' standard) • Responsible construction practices • Construction site impacts • Stakeholder participation (mandatory requirements apply to 'very good' standard) • Life cycle cost and service life planning	8 2 5 4 3	12.0%
Health and Well-Being	• Visual comfort (mandatory requirements apply to 'very good' standard) • Indoor air quality • Thermal comfort • Water quality (mandatory requirements apply to 'very good' standard) • Acoustic performance • Safety and security	Building dependent Building dependent 2 1 Building dependent 2	15.0%
Energy	• Reduction of carbon emissions • Energy monitoring (mandatory requirements apply to 'very good' standard) • External lighting • Low and zero carbon technologies • Energy efficient cold storage • Energy efficient transportation systems • Energy efficient laboratory systems • Energy efficient equipment • Drying space	15 Building dependent 1 5 2 2 Building dependent 2 1	19.0%
Transport	• Public transport accessibility • Proximity to amenities • Cyclist facilities • Maximum car parking capacity • Travel plan	Building dependent Building dependent Building dependent Building dependent 1	8.0%
Water	• Water consumption (mandatory requirements apply to 'very good' standard) • Water monitoring (mandatory requirements apply to 'very good' standard) • Water leak detection and prevention • Water efficient equipment	5 1 2 1	6.0%

Summary of Categories and Issues That make up the BREEAM Assessment			
Categories	**Issue**	**Credits Available**	**Total Credits and Weighting**
Materials	• Life cycle impacts • Hard landscaping and boundary protection • Responsible sourcing of materials (mandatory requirements apply to 'very good' standard) • Insulation • Designing for robustness	Building dependent 1 3 2 1	12.5%
Waste	• Construction waste management • Recycled aggregates • Operational waste • Speculative floor and ceiling finishes	4 1 1 1	7.5%
Land use and ecology	• Site selection • Ecology value of site and protection of ecological features • Mitigating ecological impact (mandatory requirements apply to 'very good' standard) • Enhancing site ecology • Long-term impact on biodiversity	2 1 2 Building dependent Building dependent	10.0%
Pollution	• Impact of refrigerants • NOx emissions • Surface water run-off • Reduction of night time light pollution • Noise attenuation	3 Building dependent 5 1 1	10.0%
Innovation	• Innovation	10	Additional 10%

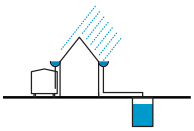
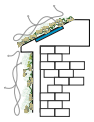
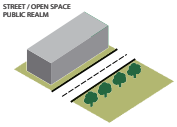
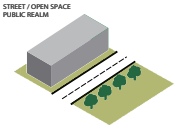
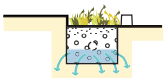
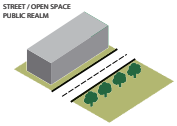
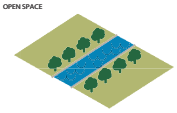
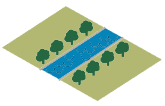
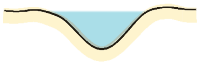
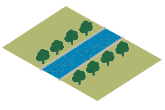
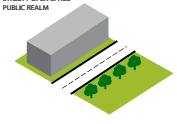
Appendix 9: Improvements to Existing Buildings in Waveney



Source: Waveney Renewable Energy and Sustainable Construction Study (2009)

Appendix 10: Measures to Manage Surface Water Run-Off

Sustainable Urban Drainage Systems

	DESCRIPTION:	SCALE:	LAND TAKE:	BENEFITS:
 RAINWATER HARVESTING	Rainwater is collected from the roof of a building and stored in an overground or underground tank for treatment and reuse within the plot.	 BUILDING SCALE	WATER STORAGE (UNDERGROUND OR ABOVE GROUND)	 FILTRATION ATTENUATION
 GREEN ROOFS / WALLS	Soil and plant material is attached to the roof or walls of a building to create a living surface. Water is stored in the soil layer and absorbed by vegetation.	 BUILDING SCALE	BUILDING INTEGRATED	 ECOLOGY AND BIODIVERSITY ATTENUATION
 SWALE / FILTER STRIPS	Shallow depressions designed to convey and filter water. These can be 'wet' where water gathers above the surface, or 'dry' where water gathers in a gravel layer beneath. Surface can be vegetated. Can be lined or unlined to allow infiltration. Often used alongside roadways.	 STREET / OPEN SPACE PUBLIC REALM	2-5 % DRAINAGE AREA 2-3 METRES WIDE	 ECOLOGY AND BIODIVERSITY FILTRATION
PERMEABLE PAVING	Paving which allows water to soak through. Can be in the form of paving blocks with gaps between solid blocks or porous paving where water filters through the block itself. Water can be stored in the sub-base beneath or allowed to infiltrate into ground below.	 STREET / OPEN SPACE PUBLIC REALM	5% DRAINAGE AREA	 FILTRATION ATTENUATION
 BIORETENTION	A vegetated area with gravel and sand layers below designed to channel water vertically to filter and cleanse. Water can infiltrate ground below or drain to a perforated pipe.	 STREET / OPEN SPACE PUBLIC REALM	1-4 % DRAINAGE AREA	 ECOLOGY AND BIODIVERSITY FILTRATION ATTENUATION
 HARDSCAPE STORAGE	Hardscape water features can be used to store run-off. These can be integrated into public realm areas with a more urban character.	 OPEN SPACE	3-5 % DRAINAGE AREA	 ECOLOGY AND BIODIVERSITY FILTRATION ATTENUATION
 WETLAND	Wetlands are shallow vegetated water bodies with a varying water level. Specially selected plant species are used to filter water. Water flows horizontally and is gradually treated before being discharged.	 OPEN SPACE	5-15% DRAINAGE AREA	 ECOLOGY AND BIODIVERSITY FILTRATION ATTENUATION
 POND	Ponds can be used to store water. 'Wet' ponds have a constant body of water and run-off is additional, while 'dry' ponds are empty during periods without rainfall. Ponds can be designed to allow infiltration to ground or to store water for a period of time then discharge.	 OPEN SPACE	3-5 % DRAINAGE AREA (RETENTION POND) 5-15% DRAINAGE AREA (INFILTRATION POND)	 ECOLOGY AND BIODIVERSITY FILTRATION ATTENUATION
 SOAKAWAY	A subsurface structure into which surface water is conveyed to allow infiltration into the ground. A soakaway may consist for example, of a hole dug in the ground and then filled with brick, rubble or other suitable inert material and covered over.	 STREET / OPEN SPACE PUBLIC REALM	1-4 % DRAINAGE AREA	 FILTRATION ATTENUATION

Source: Lowestoft Lake Lothing and Outer Harbour Area Action Plan, January 2012

Appendix 11: Example Planning Conditions for CfSH and BREEAM Requirements

Proposals anywhere in the District outside of the Sustainable Urban Neighbourhood and Kirkley Waterfront, Peto Square, and PowerPark, Lowestoft:-

1) Outline or detailed application for one or more dwellings

Prior to the occupation of the final dwelling on the site, a final Code for Sustainable Homes certificate for each dwelling shall be submitted to, and approved in writing by, the Local Planning Authority. The final certificate shall be produced by an accredited assessor and demonstrate compliance with code level 3.

Reason: To ensure the delivery of sustainable construction.

2) Detailed application for one or more dwellings where a pre-assessment report of interim certificate has been submitted with a planning application and it shows the Code level not to be achievable (also applicable for a variation of condition application)

Prior to the occupation of the final dwelling on the site, a final Code for Sustainable Homes certificate for each dwelling demonstrating that elements of the Code shown to be achievable in the Code for Sustainable Homes pre-assessment report or Code for Sustainable Homes interim certificate have been delivered for that dwelling shall be submitted to, and approved in writing by, the Local Planning Authority.

Reason: To ensure the delivery of sustainable construction.

3) Outline or detailed application of an office or school with over 1000m^2 gross floorspace

Prior to the occupation of the building, a final BREEAM certificate for that building shall be submitted to, and approved in writing by, the Local Planning Authority. The final certificate shall be produced by an accredited assessor and demonstrate compliance with 'very good' standard.

Reason: To ensure the delivery of sustainable construction.

Proposals within the Sustainable Urban Neighbourhood and Kirkley Waterfront, Peto Square, and PowerPark, Lowestoft:-

4) Outline or detailed application for one or more dwellings

Prior to the occupation of the final dwelling on the site, a final Code For Sustainable Homes certificate for each dwelling shall be submitted to, and approved in writing by, the Local Planning Authority. The final certificate shall be produced by an accredited assessor and demonstrate compliance with Code level 3 and standards for energy and water equivalent to Code level 5.

Reason: To ensure the delivery of sustainable construction.

5) Outline or detailed application of an office or school with over 1000m2 gross floorspace

Prior to the occupation of the building, a final BREEAM certificate for that building shall be submitted to, and approved in writing by, the Local Planning Authority. The certificate shall be produced by an accredited assessor and demonstrate compliance with 'very good' standard and the energy and water requirements equivalent to 'excellent' standard.

Reason: To ensure the delivery of sustainable construction.

6) Outline or detailed application of a non-residential building that is not an office or school with over 1000m^2 gross floorspace

Prior to the occupation of the building, documentation will be submitted to, and approved in writing by, the Local Planning Authority that demonstrates energy and water standards equivalent to BREEAM 'excellent' standard have been achieved.

Reason: To ensure the delivery of sustainable construction.

Glossary

Adaptation
Involves adjustments to natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Affordable Housing
Affordable housing includes social and affordable rented and intermediate housing, provided to specified eligible households whose needs are not met by the market.

Air Bricks
Allow ventilation of the space below the ground floor of a building.

Air Pollution
The presence of one or more contaminants in the outdoor atmosphere such as dust, fumes, gas, odour, or smoke, that are harmful to humans, plants or animals due to nature of the contaminant and/or the quantity occurring.

Air Tightness
The resistance of a building to inward and outward air leakage.

Annual Monitoring Report (AMR)
It is a requirement of the Planning Act for local planning authorities to monitor and review progress towards the delivery of the local development documents. Progress is set down in an Annual Monitoring Report which has to be prepared by the December following the end of the previous financial year.

Appropriate Assessment (AA)
The assessment of the effects of a plan or project on European sites of wildlife importance (SACs, SPAs and Ramsar sites – known collectively as the Natura 2000 network). This process is a requirement of the Habitats Directive.

Area Action Plans (AAP)
These are used to provide a planning framework for areas of significant change or conservation. They are part of the Development Plan.

Article 4(1) Direction
Local authorities are able to increase controls within conservation areas through the application of Article 4(1) directions. These make further restrictions on permitted development rights to residential properties. Once these have been imposed in an area, it means that planning permission will be required for those changes to which the restrictions apply.

Biodiesel
Can be produced from straight vegetable oil, animal oil/fats, tallow and waste cooking oil. It is similar to conventional 'fossil' diesel.

Biodiversity

The variety of plant and animal species, plus the groups of species which make up particular habitats. These help to maintain a balanced environment at all levels, from local to global.

Biogas

Gas produced by the breakdown of organic matter in the absence of oxygen.

Biomass

A renewable energy source, often made from plant based material that can be used as fuel, for example, wood chippings.

British Research Establishment

Acting a Trust, the BRE Group are a UK based world leading research, consultancy, training, testing and certification organisations delivering sustainability and innovation across the built environment. The BRE Trust is to be held as a national asset on behalf of the construction industry and its clients, independent of specific commercial interests. This protects BRE's impartiality and objectivity in research and advice.

(The) Broads Authority Area

This area, which includes parts of Waveney District outside the area covered by the Waveney Local Development Framework, has status equivalent to a national park. Under the Norfolk and Suffolk Broads Act 1998, the Broads Authority is the Local Planning Authority for the area. It has the statutory duties of conserving and enhancing its landscape, wildlife and cultural heritage; promoting opportunities for the understanding and enjoyment of its special qualities by the public; and protecting its navigation.

Building Emission Rate (BER)

Actual carbon emissions from a building.

Building for Life

Tool for assessing the design quality of new homes and neighbourhoods.

Building Regulations

Statutory instruments used to ensure that new buildings achieve standards set out in legislation.

Carbon Compliance

The use of on-site micro-energy generating technologies to achieve zero carbon development.

Carbon Emissions

The burning of fossil fuels releases carbon dioxide (CO2). Although naturally occurring, its increasing concentration in the atmosphere is contributing to climate change.

Carbon Neutral

A development that achieves no net carbon emissions from all types (regulated and unregulated) of energy use on an annual basis. It is usual for a development to emit some greenhouse gas emissions, so it is necessary to use carbon offsets to achieve neutrality.

Climate Change

A change in climate attributable directly or indirectly to human activity such as the burning of fossil fuels which alters the composition of the atmosphere and causes changes in weather patterns on a large scale. Commonly used interchangeably with "global warming" and "the greenhouse effect".

Code Assessor

Person qualified and certified to undertake a Code for Sustainable Homes or BREEAM assessment.

Code for Sustainable Homes (CfSH)

The Code for Sustainable Homes was introduced in England in 2007. The Code has been mandatory since 2008 setting standards to improve the overall sustainability of new homes by setting a single framework within which the home building industry can design and construct homes to a higher environmental standard.

Community Infrastructure Levy (CIL)

A charge on development which local planning authorities can choose to set and which is designed to help fund needed infrastructure identified in their plans.

Conservation Area

An area, designated by a local authority, of special architectural or historic interest within towns and villages, which has been given special status to ensure its protection and enhancement.

Conservation Area Appraisals

Describes the character of the area, identifies its special character, puts forward a basis for effective policy control of development and identifies proposals for its enhancement.

County Wildlife Site (CWS)

Areas of county-wide wildlife interest as defined using the following criteria:

- Woodland sites are selected using a number of criteria; ancient status, well developed structure and diverse ground flora;
- Grasslands are selected on the basis of unimproved status, floral diversity and presence of rarities;
- Other habitats which are regionally or nationally scarce, e.g. heathland, vegetable shingle or open water are also represented;
- Any sites which support a population of one or more species listed in Schedule 5 or 8 of the Wildlife and Countryside Act or the Red Data book are included.
- Taken from 'A Register of County Wildlife Sites in Suffolk' (1991 and updates), compiled by Suffolk Wildlife Trust and Suffolk County Council.

Decentralised Energy Supply

Energy supply from local renewable and local low-carbon sources (ie on-site and near-site, but not remote off-site) usually on a relatively small scale. Decentralised energy is a broad term used to denote a diverse range of technologies, including micro-renewables, which can locally serve an individual building, development or wider community and includes heating and cooling energy.

Density

In the case of residential development, a measurement of the number of dwellings per hectare. Net housing density excludes for example structural landscaping.

Design and Access Statement

A statement accompanying a planning permission that lays out the design principles on which a development proposal is based. They should demonstrate that the applicant has thought about how everyone, including disabled people, older people and very young children, will be able to use the development.

Development

Defined in Section 55 (1) of the Town and Country Planning Act 1990 as 'the carrying out of building, engineering, mining and other operations in, on, over or under land, or the making of any material change in the use of any buildings or land'.

Development Management Policies

These are likely to be criteria based policies which will be applied to ensure that all development meets the overall vision and strategic policies set out in the Core Strategy. To a greater or lesser extent these polices will need to be taken into account in the determination of the majority of planning applications. The development management policies form part of the Development Plan.

Draught Proofing

Sealing of gaps between surfaces to stop air flow.

Dwelling Emission Rate (DER)

The design rate of carbon emissions from a dwelling, measured in kilograms per square metre of floor area per annum.

Economic Development

Development that creates new, or safeguards existing jobs.

Energy Efficiency

Making the best or most efficient use of energy in order to achieve a given output of goods or services and of comfort and convenience.

Energy Mix

Composition of fuels and technologies to generate energy.

Energy Opportunities Plan (EOP)
Indicative strategic map showing key energy opportunities across the District for low carbon and renewable energy.

Evidence Base
Information and data gathered by the Council to justify the 'soundness' of the policy approach set out in Local Development Documents.

Exception Test
Method of managing flood risk while allowing appropriate development to take place.

Forest Stewardship Council (FSC)
Independent, non-governmental, not for profit organisation established to promote the responsible management of the world's forests.

Flood Risk Assessment
A site specific assessment of all types of flood risk to the proposed development itself and to others in the locality. All planning applications for development of 1 hectare or greater in any flood zone are required to include a Flood Risk Assessment. All planning applications for development in Flood Zones 2 and 3 require Flood Risk Assessments.

Floor Insulation
Insulating material is put under the floorboards to prevent loss of heat through the floor.

Geodiversity
The natural diversity of geological features (rocks, minerals, fossils and structures), geomorphological features (landforms and processes) and soil features that make up the landscape. This includes their assemblages, relationships, properties, interpretations and systems.

Greenhouse Gas
Atmospheric gases such as carbon dioxide, methane, chlorofluorocarbons (CFCs) etc that function like a "greenhouse" by trapping some of the sun's energy that reaches the earth, preventing it from being reflected back out of the earth's atmosphere, and thereby warming the earth's climate.

Greenest County
An aspiration that involves partnerships across Suffolk County to enhance the natural and historic environment and respond to climate change.

Grid Connection
When a development is connected into the electricity or gas network enabling the distribution of energy.

Greenfield Land

Land which has not been previously developed i.e. fields, woods, meadows, or land that has no recent history of development.

Heritage (built and architectural)

Historical, architectural and archaeological features, buildings and monuments that are of local, regional or national interest.

Heritage Asset

A building, monument, site, place, area or landscape positively identified as having a degree of significance meriting consideration in planning decisions. Heritage assets are the valued components of the historic environment.

Heritage Coast

An area of coastline protected and promoted by Natural England in association with local authorities for the enjoyment of the coast whilst protecting its natural beauty, nationally important wildlife and landscape features and improving the quality of inshore waters and beaches.

Hub Height

Distance from the turbine platform (base) to the rotor.

Watt (W)

Measure of the rate of energy conversion or transfer.

Kilowatthour (kWh)

A unit of energy equivalent to 1kW (1000W) of power being expended over 1 hour.

Land Drainage Consent

Permission for development that could affect a watercourse, flood defence or have implications for flooding.

LAeq

When a noise varies over time, the LAeq is the equivalent continuous sound which would contain the same sound energy as the time varying sound. It can be thought of as an average where noisy events have a significant influence.

Landscape and Visual Impact Assessment (LVIA)

Report that assesses the magnitude of change with the sensitivity of the landscape to a proposed development. This provides a measure of the significance of the effect.

Light Pollution

The illumination of the night sky caused by artificial light sources on the ground, which reduces visibility of the night sky and can have very harmful effects on animal habits and patterns.

Listed Building

A building or structure designated by the Secretary of State for the Department of Culture, Media, and Sport as being of special architectural or historical interest.

Local Development Framework (LDF)

The name for the portfolio of documents making up the Framework, which will provide the spatial planning strategy for a local authority area. It consists of the Development Plan Documents, a Statement of Community Involvement, the Local Development Scheme, and Annual/Authorities Monitoring Reports. However, through the Coalition Government's changes to the planning system the term "Local Plan" has been re-introduced.

Local Development Order (LDO)

An order made by the Local Planning Authority for the purpose of extending permitted development rights for certain types of development.

Local Plan

Comprises local planning policy documents that have the status of Development Plan Documents and contain policies against which local planning decisions are made. Also see "Local Development Framework".

'Manual for Streets'

Published by the Department for Transport, gives advice for the design of residential streets in England and Wales.

Mechanical Ventilation

Where mechanical devices are used to assist natural ventilation.

Megawatt (MW)

1 megawatt is equivalent to 1,000,000W or 1,000kW.

Micro-Generation

Is the small-scale generation of heat and power by individuals, small businesses and communities to meet their own needs.

Mitigation

Involves taking action to reduce the impact of human activity on the climate system, primarily through reducing greenhouse gas emissions.

Mixed Use Development

A term used to refer to a variety of types of development on a particular site.

National Calculation Method (NCM)

Procedure for demonstrating compliance with the Building Regulations for non-residential buildings by calculating the annual energy use for a proposed building and comparing it with the energy use of a comparable 'notional' building.

Natural (or Passive) Ventilation

Can naturally ventilate homes by using the natural upward movement of warm air and the downward movement of cool air, without the need for air conditioning or electric fans.

Notional Building

Imaginary building that is the same shape, size and use as the actual building which would comply with the minimum Building Regulations requirements. It is used to determine the Target Emission Rate (TER).

Open Space

Covers a broad range of open spaces as defined in the annex to PPG17: Planning for Open Space, Sport and Recreation (DCLG, 2002) and the Waveney District Council Open Space Supplementary Planning Document.

Permeable Paving

A particular type of paving that avoids the use of cement between paving stones, allowing surface water runoff to percolate down between the paving, removing some pollutants contained in the runoff in the process.

Proposals Maps

Ordnance Survey maps which identify the areas to which policies and proposals in the development plan documents relate.

Recycled Material

This involves the breaking down of a material through energy intensive processing, generally to enable new products to be created from the raw material.

Recycled Water

Any water that has been used at least once and then supplied for reuse, either treated or untreated.

Register Plates

Located at the top of the fireplace, the register plate seals the chimney stack and prevents any smoke or other flue gases getting back into the room.

Regeneration

Regeneration centres on the physical development of land, buildings and new transport systems. It also seeks to capture and maximise benefits for the people through economic and social regeneration in terms of skills, social and economic inclusion, prosperity, education, housing, health, community development and the environment. It is closely aligned to neighbourhood renewal.

Renewable and Low Carbon Energy

Includes energy for heating and cooling as well as generating electricity. Renewable energy covers those energy flows that occur naturally and repeatedly in the environment – from the wind, the fall of water, the movement of the oceans, from the sun and also from biomass. Low-carbon technologies are those that can help reduce carbon emissions. Renewable and/or low-carbon energy supplies include, but not exclusively, those from biomass and energy crops; CHP/CCHP (and micro-CHP); waste heat that would otherwise be generated directly or indirectly from fossil fuel; energy from waste; ground source heating and cooling; hydro; solar thermal and photovoltaic generation; wind generation.

Regulated Emissions

Those emission included within the SAP methodology and arising from space heating, water heating, fixed lighting and ventilation.

Residential Amenity

Living conditions in and around a dwelling.

Scheduled Ancient Monument

A building, structure or work of national importance included by the Secretary of State in the schedule of monuments.

Section 106 Planning Obligation

A legal agreement which provides a means of ensuring that developers contribute towards the infrastructure that is required to make a development acceptable in planning terms.

Sequential Test

Used to determine the suitability of land for development when considering flood risk.

Site Specific Allocations

The allocation of sites for specific or mixed uses. Policies will identify any specific requirements for the site. The allocations form part of the Development Plan.

Stand Alone Technologies

Technologies that can operate independently of other structures or technologies.

SuDS Approval Body

Has responsibility for the approval of proposed drainage systems in new developments and redevelopments, subject to exemptions and thresholds. The SuDS Approval Body is also responsible for adopting and maintaining SuDS for developments of more than one property. In Waveney the SuDS Approval Body is Suffolk County Council.

Standard Assessment Procedure (SAP)

Assessment used to generate the energy rating of dwellings on a scale from 0 to 120, based on the calculated annual energy requirement for space and water heating.

Suffolk Biodiversity Partnership (SBP)

The partnership comprises a range of governmental and nongovernmental organisations working together to provide a sound base of countywide ecological data, formulate county level Biodiversity Action Plans, co-ordinate better protection for habitats and species, raise awareness of Suffolk's biodiversity and influence plans and strategies.

Suffolk Biodiversity Action Plans (BAPs)

The local version of the national biodiversity action plan concentrating on those species and habitats particularly relevant to Suffolk.

Supplementary Planning Documents (SPD)

These provide additional information to assist with the implementation of a policy in a development Plan document e.g. a development brief for a specific site. They do not form part of the Development Plan.

Sustainable Development

Sustainable development is an approach towards development that aims to ensure people satisfy their basic needs and enjoy a good quality of life without compromising the quality of life for future generations. The Government will try to achieve that through five principles: living within environmental limits; ensuring a strong, healthy and just society; achieving a sustainable economy; promoting good governance; and using sound science responsibly.

Sustainable Drainage Systems (SuDS)

System where surface water (i.e. rainwater) drains naturally back into the underground water system rather than to waste water treatment works. These avoid adding flood risks by mimicking natural drainage processes and provide benefits for sustainability, water quality and amenity.

Target Emission Rate (TER)

The calculated target carbon emissions rate of a notional building.

Trickle Vents

Small opening in window or other building component designed to allow small amounts of ventilation in spaces intended to be naturally ventilated when the windows or doors are closed.

Under Floor Grilles

Thin structure under the floor to allow small amounts of air flow.

Unregulated Emissions

Emissions arising from electrical appliances, cooking and non-fixed lighting.

Validation

The checking of a planning application to confirm it is complete and all documentation has been submitted as required.

Wall Vents

Small gaps designed to enable air flow that will prevent the build up of moisture and condensation.

Watching Brief

The presence of someone on site who has the responsibility to watch and ensure that events take place properly.

Water Butt

A large cask or barrel which is set up on its end to collect and store rainwater for irrigation purposes.

Water Stress

Occurs when the demand for water exceeds the amount of water available for use.

Zero Carbon

A development that achieves no emissions of carbon from energy use on site.

References, links and additional information

Association of Chief Police Officers: www.securedbydesign.com

Bat Conservation Trust: www.bats.org.uk
BREEAM Assessors: www.greenbooklive.com
British Research Establishment: www.bre.co.uk

- BREEAM New Construction: Non-Domestic Buildings: Technical Manual (2011)
- Green Guide to Specification (2008)

British Research Establishment Environmental Assessment Method: www.breeam.org
Broads Authority: www.broads-authority.gov.uk

- Landscape Sensitivity Study for Renewables and Infrastructure (2012)
- New Opportunities for the Sustainable Management of Fens Reed Pelleting Composting and the Productive Use of Fen Harvests (2010)

Buglife: www.buglife.org.uk

- Creating Green Roofs for Invertebrates – A best practice guide (2012)

Carbon Trust: www.carbontrust.com/home

- Tools, Guides and Reports - 'Wind Yield Estimator Tool' (2012)

Centre Point of Expertise on Timber: www.cpet.org.uk
Construction Industry Research and Information Association (CIRIA): www.ciria.org

- Sustainable Urban Drainage Systems (2012) www.susdrain.org

Civil Aviation Authority: www.caa.co.uk
Code for Sustainable Homes Assessors: www.bre.co.uk / www.stroma.com / www.communities.gov.uk
Considerate Constructors: www.ccscheme.org.uk

- Considerate Constructors Scheme: Examples of Good Practice (2012)

Constructing Excellence: www.constructingexcellence.org.uk
Creating the Greenest County: www.greensuffolk.org

Department for Business, Innovation and Skills: www.gov.uk

- East of England Renewable and Low Carbon Energy Capacity Study (2012)
- The Assessment and Rating of Noise from Wind Farms' (ETSU-R-97) (1996)

Department for Communities and Local Government (DCLG): www.gov.uk

- National Policy Statements (2011)
- Environmental Impact Assessment: A Guide to Procedures (2000)
- Planning practice guidance for renewable and low carbon energy (2013)
- Definition of Zero Carbon Homes and Non-Domestic Buildings Consultation (2008)
- Simplified Building Energy Model (SBEM) modelling guide (for buildings other than dwellings in England and Wales) (2008)
- Standard Assessment Procedure (SAP) (2009)
- Planning Permission Requirements for Small-Scale Renewable Energy Technologies (2012)
- Localism Act (2011)

Department for Energy and Climate Change: www.decc.gov.uk

- East of England Renewable and Low Carbon Energy Capacity Study (2012)
- National Heat Map (2012)
- Climate Change Act (2008)
- Micro-Generation Strategy (2011)
- National Policy Statements for Energy and Infrastructure (2011)
- The UK Low Carbon Transition Plan (2011)
- UK Renewable Energy Roadmap (2011) (and updates)

Department for Environment, Food and Rural Affairs (DEFRA): www.defra.gov.uk

- Non-Statutory Guidance for Site Waste Management Plans (2006)
- Securing the Future (2005)
- Special Areas of Conservation (2012)
- Special Protection Areas (2012)
- Ramsar sites (2012)

Department for Environment, Environment and Rural Affairs (Joint Nature Conservation Committee): http://jncc.defra.gov.uk/

Design Council: www.designcouncil.org.uk

- Building for Life (2011)

Energy Savings Trust: www.energysavingstrust.org.uk

- Domestic-scale renewable energy technologies
- Feed-In Tariffs Scheme
- Renewable Heat Incentive
- Green Deal and Energy Company Obligation (ECO) (2012)

English Heritage: www.english-heritage.gov.uk

- Scheduled Monuments (2012)
- Energy Efficiency and Historic Buildings: Application of Part L of the Building Regulations to historic and traditionally constructed buildings (2011)

Environment Agency: www.environmentagency.gov.uk

Forest Stewardship Council: www.fsc-uk.org

Highways Agency: www.highways.gov.uk

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